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KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ISSUES AND OPTIONS

(Volume 1 of 2 Volumes - Main Report & Annexes 1-5)

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KENYA

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ACRONYMS

ADB	=	African Development Bank
ALDEV	=	African Land Development
ALMO	=	African Livestock Marketing Organization
AFC	=	Agricultural Finance Corporation
AEZ	=	Agro-Ecological Zone
ASAL	=	Arid and Semi-Arid Lands
AIA	=	Apropriation-in-Aid
CEC	=	(Soils)
DDC	=	District Development Council
DDO	=	District Development Officer
GOK	=	Government of Kenya
IFAD	=	International Fund for Agricultural Development
ILO	=	International Labour Organization
KREP	=	Kenya Rural Enterprise Programme
Ksh	=	Kenyan Shillings
LU	=	Livestock Unit
LW	=	Liveweight
MOA	=	Ministry of Agriculture
MCSS	=	Ministry of Culture and Social Services
MERD	=	Ministry of Energy and Regional Development
MENR	=	Ministry of Environment and Natural Resources
MF	=	Ministry of Finance
MLD	=	Ministry of Livestock Development
MPND	=	Ministry of Planning and National Development
MOWD	=	Ministry of Water Development
NCPB	=	National Cereals and Produce Board
NEP	=	National Extension Project
NIB	=	National Irrigation Board
NGO	=	Non-Governmental Organization
PEM	=	Protein-Energy Malnutrition
RDF	=	Rural Development Fund
SIDA	=	Swedish International Development Authority
T&V	=	Training and Visit
USAID	=	U.S. Agency for International Development
WB	=	World Bank
YP	=	Youth Polytechnic

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I. INTRODUCTION

1.1 Following discussions between the International Fund for Agricultural Development (IFAD) and the Government of Kenya (GOK) it was agreed that a mission should be mounted to work with Ministry of Planning and National Development (MPND) to examine issues and options for the development of Kenya's arid and semi-arid lands (ASAL) with particular reference to economic activities. An FAO Investment Centre mission <sup>1/</sup> worked in Kenya from 18 October 1986 to 13 November 1986. During the course of that mission the opportunity was taken to note existing development and to discuss ongoing and proposed programmes with appropriate government ministries and the many existing donors investing in ASAL areas. Towards the end of the mission's stay in Kenya there was a round table meeting with donors to discuss the mission's tentative conclusions concerning administrative, managerial and institutional arrangements. This meeting was well attended and very constructive. The round-up meeting with Government was called and chaired by MPND. It was attended by representatives from Ministry of Agriculture (MOA), Ministry of Livestock Development (MLD), <sup>2/</sup> Ministry of Culture and Social Services (MCSS), Ministry of Water Development (MOWD) and Ministry of Finance (MF). Tentative findings were well received at this meeting and it was agreed that the mission report would form the basis for local preparation work, in particular the development of a series of discussion papers for presentation to a government donor workshop scheduled for June 1987.

1.2 The present paper briefly sets out the background to the ASAL areas, takes an overview of existing government support programmes and discusses the possibilities for development. Development options and the major issues which are raised are dealt with in the final chapters.

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<sup>1/</sup> John Williams, Agronomist/Mission Leader; H. Johnson, Economist (consultant); A. Carloni, Socio-economist (consultant); R. Angier, Rural Engineer (consultant) and A. O'Brien, Livestock Specialist (consultant). The mission was assisted by Mr. S. Olowude, IFAD during its final week in the field.

<sup>2/</sup> The Ministry of Agriculture and Livestock Development was split into two separate ministries during the mission's stay in Kenya. Clear demarcation of responsibilities had not been made at the time of mission departure.

## II. BACKGROUND

### The ASAL Areas

2.1 The ASAL areas of Kenya were formerly characterised by plentiful pasture and browse resources to sustain the sparse pastoral population and their livestock. Increased population and livestock have gradually altered the fragile balance of the area which has moved from self-sustaining pastoral production to being increasingly cropped for food. Because of inter-seasonal variations in rainfall it is now an area where food security is a major problem. In fact Northern and Northeastern Kenya have received famine relief for the past decade.

2.2 Definition of the arid and semi-arid lands dates back to a 1979 GOK document, Arid and Semi-Arid Lands Development in Kenya. That document uses the ecological zones from the Kenya Atlas (1970) and classifies the ASAL areas as zones IV to VI out of production zones II-VI. ASAL areas lie within 27 Districts which have been categorized by degree of aridity (Map 1.)

Category A, completely or nearly completely in zones V and VI, Mandera, Wajir, Garissa, Marsabit, Isiolo and Turkana.

Category B, more than 85% in zones IV, V and VI, Tana River, Taita, Kitui, Kajiado and Samburu.

Category C more than 50% in zones IV, V and VI, Laikipia, Embu, Meru, Baringo, W. Pokot, Machakos, Kilifi and Kwale.

Category D less than 50% in zones IV, V and VI, Lamu, Narok, Nakuru, Elgeyo/Marakwet, Nyeri, Kirinyaga, Muranga and Kiambu.

2.3 Subsequently the zoning system was refined. Seven agroecological zones were elaborated and used in the Farm Management Handbooks and District agroecological maps (Jatzold 1982). Using this methodology ASAL was defined as zones IV-VII out of production zones 0-VII. The basis for all definitions is moisture availability: Zone IV - Transitional Zone ratio of  $r/EO = 0.4$  to  $0.5$ ; Zone V - Semi-Arid Lands  $r/EO = 0.25$  to  $0.4$ ; Zone VI - Arid Lands  $r/EO = 0.15$  to  $0.25$ ; Zone VII - Very Arid (Perarid)  $r/EO =$  Below  $0.15$ . In effect the ASAL areas are those having a ratio of rainfall to open pan evaporation of less than 50%. The ASAL areas of Kenya cover some 473,000 km<sup>2</sup>, 82% of Kenya's land area. Within ASAL only 58,000 km<sup>2</sup> (12%) is classified as zone IV and 87,300 km<sup>2</sup> (18%) as zone V (Map 2).

2.4 It is tempting to redefine the ASAL areas as zones V-VII out of production zones 0-VII, as these zones present a completely different set of technical problems to those encountered in zone 0-IV. Redefinition poses a number of problems as it would substantially alter the nature of ASAL projects, reduce the number of potential beneficiaries significantly, but only affect the land area marginally. For purposes of this report the original zones IV-VI have been retained and are assumed to have a similar total area to zones IV-VII. Annexes 5, 8 and 9 are concerned in the main with possible solutions to production problems in zones V-VII. The implications of redefining the ASAL area should be examined in more detail. Given that Zone IV already benefits from national projects designed for the medium and high potential area redefinition could facilitate concentration

on the production problems of the truly semi-arid and arid areas. This is an outstanding issue that needs to be resolved.

#### The Target Group (Annex 2)

2.5 The 1979 population census shows that five million people, one-third of Kenya's population lived in the ASAL areas. The average rate of population increase is slightly higher than the national average (4%). In-migration from outside provinces is extremely limited, but migration from zones IV to V and VI is an important phenomenon within transitional districts, and dryland cultivation is rapidly expanding on the fringes of ranching areas. Three broad occupational categories can be defined: smallholders engaged in mixed farming on marginal land; pastoralists who also farm marginal land; and pastoralists who rarely crop. The numbers in each category are not reliably known but World Bank (Collier and Lal 1982) has estimated that there are about 1 million pastoralists. The number of pastoralists who crop is apparently increasing, from an estimated 20% in 1976 to 60% today.

2.6 Smallholders engaged in mixed farming reside in the higher potential areas of ASAL, crop less than 2 ha of land and may or may not have integrated livestock into the farming system, depending on availability of outside (usually communal) grazing. Subsistence food crop production is the main food source, with food deficit the norm. Cash income results primarily from labour migration, sale of livestock and non-farm production.

2.7 Pastoralists reside outside the mixed farming areas, own a variable number of livestock but distribution is highly skewed with approximately 50% of the livestock owned by 10% of the population. Food cropping, which is practised by the majority, is dependent on soils, precipitation, supplementary irrigation, and linked (normally) to necessity to supplement available milk supplies with grain in the dry season. Livestock sales are the main source of cash but off-farm income and food-for-work are increasingly important.

2.8 Despite the fact that the ASAL areas are best suited to livestock production all pastoralists are being pushed inexorably towards increased dependence on cropping and off-farm income to sustain themselves.

2.9 Poverty is widespread in the ASAL areas. World Bank statistics (Annex 2, table 1) show that 55% of migrants to drylands, 85% of migratory pastoralists and 33% of sedentary pastoralists are below the poverty line. Although the figures are derived from national data, the above groups reside overwhelmingly in the ASAL areas.

#### The Resource Base

2.10 Climate. The ASAL areas as presently defined have a rainfall to evapotranspiration ratio of less than 0.5. They are subject to erratic rainfall both within and between seasons and high intensity storms which produce considerable run-off in the absence of adequate tree or bush cover or suitable structures. Average rainfall figures are deceptive in these circumstances as there tends to be a limited number of years well above average whilst the 60% probability is well below. This situation is further complicated in Kenya because average annual figures disguise bimodal rainfall allowing two potential crop seasons in Eastern Kenya and at the Coast, whilst reflecting monomodal rainfall, with a slight mid season decrease in precipitation in, and west of, the Rift Valley. Approximate rainfall expectancy in each of the zones IV-VII is as tabulated below.

AEZ	Average Annual Rainfall mm	60% probability mm	
		1st season	2nd season
IV	700-950	250-350	250-350
V	650-800	150-300	150-200
VI	400-600	100-200	100-200
VII	<400	n.d.	n.d.

n.d. not documented

2.11 Soils (Annex 9). Soils in the ASAL areas have with minor exceptions limitations for crop use. They are generally of light to medium texture with moderate to low water holding capacity and have moderate to low fertility status and CEC. In general they are subject to compaction and capping. Exceptions to the above are limited areas of soils of volcanic origin, alluvial/colluvial soils which occur locally and heavy clays. Colluvial/alluvial and volcanic soils are selected for agricultural use as far as possible. Clays are avoided because they are very difficult to work by traditional methods. A further constraint to use of some of the heavier soils is salinity/sodicity of varying severity. Phosphate is stated to be the main limiting mineral and phosphate fixation is associated with the ferrosols. To an extent these deficiencies have been overcome traditionally by shifting cultivation but this system of husbandry is becoming increasingly ineffective as the length of bush fallow decreases, and/or tree cover is reduced by heavy grazing. Manure is used by a minority of farmers in areas of high population density particularly zone IV. Mineral fertilizers are neither used nor recommended at prevailing levels of husbandry.

2.12 Water Resources (Annex 7). The ASAL areas form part of four major catchments; Rift Valley, Ewaso Ngiro, Tana and Athi drained by river systems emanating from the highland massif. Main rivers are subject to high and low seasonal flows which show increasingly dramatic variations and silt loads as cultivation and deforestation increases in the highland areas, but which are also increasingly regulated as dams, mainly for electrical power, are constructed. Tributaries of the main systems used in the ASAL areas are ephemeral. Groundwater potential is very variable in both quantity and quality.

2.13 Surface water resources are being exploited for stock and domestic water supplies and irrigation, whilst sub-surface water is only used for stock and domestic purposes at present. For stock and domestic purposes roof catchments, pans and tank dams, diversion channels, gravity pipelines, hydraulic and turbine pumps, sub-surface and sand dams, open hand dug wells, rock catchments and deep and shallow boreholes are exploited. Development has been ongoing since 1954, but maintenance has proved a major problem. Demand for water for stock and domestic purposes continues unabated and will do so in the absence of suitable maintenance arrangements. Recent initiatives have to the extent possible endeavoured to limit development to sites where user participation in construction and subsequent maintenance can be negotiated. Use of surface water for irrigation is traditional in some ASAL areas (Elgeyo/Marakwet, Pokot, Baringo, etc.).



#### Agriculture (Annexs 8 and 9)

2.14 Zone IV is now typically used for sedentary agriculture, with 1.5-1.5 ha of cultivation per family, and generally low, but very variable yields. The cereal crop of choice is maize, but some sorghum or millet is also grown. Typically mixed cropping is practised with legumes such as pigeon peas, cowpea and grams planted into the cereals. The area is amenable to improvement by bench terracing which has an important moisture conservation as well as a soil conservation effect. Technical packages available to improve mixed crop production are based on early planting, depth of planting, plant density and spatial distribution. Improved varieties of cereals and legumes have been tested but with the exception of maize are only available in limited quantities. Attempts to integrate livestock into the farming system, have yet to succeed, although technical answers are available. This zone has potential for improved production which Government is endeavouring to encourage through the National Extension Project (IFAD/WB) and the soil conservation project (SIDA).

2.15 Zone V. The predominant pattern of agriculture in zone V is shifting cultivation with scavenging (communally grazed) livestock, which move away from the homestead area during the dry season. This zone is ideally suited to sorghum and millet production but maize is increasingly grown, in part because of taste preference and in part because of declining labour availability for bird scaring and the decreased preparation time for consumption. Mixed cropping of cereals and legumes is normal in the area. Use of maize has increased. In two Districts (Baringo, Kitui), there are demonstrated good results from water harvesting which have yet to receive the support of a full government programme. Improved varieties are recommended for the zone but in the absence of moisture improvement they can only make a minor contribution to sustainable improved crop yields. Livestock make a major contribution to the household economy but distribution of ownership is very skewed.

2.16 Zones VI and VII. Pastoralism predominates, although shifting cultivation is practised in some parts of zone VI. Whilst the pastoralists are heavily dependent on livestock for their subsistence (meat and milk), cereal cropping is reported to be increasing. Because of the light and variable rainfall conditions cropping is only possible in areas where water concentrates naturally, valley bottoms, depressions and alluvium subject to flooding from spate river flows. In recognition of the increased need to crop, in Turkana, there has been a programme to artificially create flooding conditions. Whilst this has yet to have major benefits, the approach represents the best chance of bringing about widespread increases in crop production. The relationship between cultivation and the Arid and Semi-Arid zones is shown in Map 4.

#### Browse and Grazing (Annex 8)

2.17 The condition of browse and grazing in the ASAL deteriorates in association with increased human population for whatever reason. The mixed farming areas on the fringe of ASAL have highly degraded forage resources. Degradation is also associated with permanent water points and human settlements in the true range areas, and with sacrifice areas found in the sedentary pastoral areas. With the exception of the above range condition is variable and reportedly poor in Turkana and Samburu, but adequate in other true pastoral areas.

2.18 The livestock population of Kenya was about 12 million livestock units (of 450 kg LW) in 1981. About 50% was in the ASAL areas. Given a carrying capacity of 30 ha per LU on average in the ASAL areas (see table below) there is adequate land to carry 15 million LU. In general the range is not overstocked on this basis. Clearly problems associated with browse and grazing degradation are location specific. It also appears from the table that if four livestock units are required to support each person, even if the pastoral areas are fully stocked (15,000 LU) they would not be able to support the present human population of over 6 million. This points towards the reason why cropping is increasing. In zone IV and V grazing and browse resources are only sufficient to carry livestock which are supplementary to cropping. <sup>1/</sup>

	AEZ IV	AEZ V	AEZ VI	AEZ VII
Ha to sustain 1 livestock Unit	4 ha	10 ha	20 ha	40 ha
Livestock units required to support one person (Subsistence requirement)*	4	4	4	4
Ha required to support one person	16 ha	40 ha	80 ha	160 ha
Ha required to support a family of 7 people	112 ha	280 ha	560 ha	1120 ha
Maximum supportable population density per km.	6	2.5	1.2	0.6
Present approximate population density (mission assumption)	43	17	3	<1

\* 1 Livestock Unit is equivalent to 450 kg liveweight.  
Source: MOA Planning Unit.

2.19 Despite deteriorating range conditions pastoralists have shown little inclination to date to improve the resource, although they have received encouragement and support under donor assisted livestock projects. This disappointing result holds true, despite land adjudication, which has resulted in individual title being granted in some ranching areas (see Annex 2 for a brief discussion of the pros and cons of land adjudication). In other areas food-for-work has been used to encourage planting of browse trees and grasses, often in association with moisture harvesting techniques. The results have been disappointing except where local people were given additional cash or food for maintenance of the plantings.

#### Off-Farm Income-Generating Activities

2.20 The ability of agriculture to sustain the rural population in the ASAL areas is decreasing. The majority of households have insufficient land

<sup>1/</sup> 1 ha of cropping producing 500 kg of mixed crop is equivalent in cash terms to the offtake from 8,20,40 or 80 ha of grazing assuming milk and meat production valued at Ksh 500 per LU.

and/or livestock to meet even their subsistence requirements. The situation is made worse by subdivision of holdings, conversion of grazing land to marginal cropping in the absence of suitable technology, overgrazing, deforestation and soil erosion. The ability of agriculture to absorb labour profitably given the high risk of crop failure, is limited. Formal sector jobs are scarce and it is expensive to create more even if funds were available. This bleak scenario is exacerbated by the fact that families in the ASAL areas are more cash dependent than elsewhere because they are more vulnerable to periodic drought.

2.21 Government policy (Sessional Paper No. 1, 1986) gives high priority to expanding informal non-farm sector employment in the rural areas. Activities singled out for promotion include: manufacture of farm implements, hand tools, other farm inputs, pans and foot wear, grain milling, food and agricultural processing, rain water storage and collection system and containers for on-farm grain storage. Both Government and Non-Government Organizations would be involved.

2.22 Nationwide surveys show that over 50% of smallholders in ASAL areas engage in non-farm production and that key activities are rural services, petty trading, food processing/beer brewing, resource extraction, agri-based crafts and charcoal making. Non-farm earnings contribute over one-half of household income in ASAL areas east of the Rift and one-third in areas west of the Rift. There is evidence that such activities pay better than crop production or casual farm labour but not as well as livestock, and that non-farm earnings play a crucial role enabling families to get through bad years without selling off assets. In order to absorb available labour and to provide a livelihood to the poorer ASAL families both on and off-farm income-generating activities will need to be encouraged. In addition the employment problem can be tackled by developing the sustainable productive capacity of the lands to make it attractive for more family members to stay at home.

#### Marketing (Annex 5)

2.23 There is evidence that an increasing number of smallholders and pastoralists participate in the market economy by selling or bartering crops and livestock. Marketed products from the ASAL areas include cattle (66% of Kenya slaughterings), small stock, hides and skins, sorghum, millet, maize, cowpeas, green grams, pigeon peas, charcoal, handicrafts and sisal products. Of these cattle, maize, sorghum and millet have or have had access to formal marketing channels. Today cattle are almost exclusively dealt with by local traders because government marketing services are moribund, and all other products are sold through public markets, shopkeepers or middlemen. Sorghum and millet are still officially purchased by the National Cereals and Produce Board (NCPB) but prices offered are poor so little is attracted.

2.24 Purchasing in the ASAL areas is usually from small traders. Barter deals are common. Isolation and low population density reduce sale prices and increase purchase prices. Past attempts to tackle this problem have failed as they have normally involved heavy, unsustainable, government inputs. There is an ongoing NCPB construction programme to provide strategic grain storage throughout the ASAL areas, which may make grain cheaper to purchase and consequently improve the terms of trade for livestock producers. More recent initiatives which attempt to organize producers to remove their produce to major markets remain to be proven.

### Credit (Annex 6)

2.25 Credit for livestock/agriculture production from banks and non-bank financial institutions is largely unavailable in the ASAL areas. This is principally because the main Government agricultural credit agency, the Agricultural Finance Corporation (AFC) is largely concerned with the high potential areas and has not had much success with credit support for ranching in the past. The commercial banks, which are only represented in the main centres of population, remain reluctant lenders to agriculture and smallholders in particular. Agricultural cooperatives function to a limited extent in those parts of zone IV suited to cotton production. Ways are being sought to improve the availability of credit, especially for income-generating activities, by channelling special lines of credit through NGO's. These remain to be proven and for the moment are facing start up problems. Apart from special applications, such as specially designed income-generating activities, it is doubtful if credit should be promoted in the ASAL areas in the absence of proven technical packages. Subsidy rather than credit is likely to be required to get the programme going.

### III. GOVERNMENT SUPPORT TO THE ASAL AREAS

3.1 The Swynnerton Plan 1954 recognized the special development needs of the marginal areas of Kenya and resulted inter-alia in the establishment of the Dryland Research Station at Katumani and the formation of African Land Development (ALDEV) and African Livestock Marketing Organization (ALMO) within the Ministry of Agriculture. Further emphasis was given to ASAL development by the formation of the Range Management Division and the first of three livestock development projects within MOA in the 1960s. More recently the Marginal and Semi-Arid Lands Preinvestment Study in 1977/78 led to the commissioning of an interministerial task force in 1978 charged with formulating the objectives, constraints, strategies and a general framework for ASAL development. The task force produced a document "The Arid and Semi-Arid Lands Development in Kenya - The Framework for Implementation Programme Planning and Evaluation." Several donor-assisted projects were implemented within this framework, especially the early ASAL projects in Baringo, Machakos, Kitui and Embu/Meru. However with the withdrawal of donor support in 1983 the interministerial task force was disbanded and leadership of Government's ASAL initiative passed from MOA to MPND. In the absence of financial support the core of Government's initiative, including the Interministerial Committee of Permanent Secretaries and the Programme Coordination Committee ceased to function.

3.2 The line ministries of government maintain large, and increasing, numbers of staff in the ASAL areas, which are generally underfunded. They are unable to obtain normal working allowances and have very limited access to transport. The overall picture is one of gradual stagnation as the necessary government support funding for development becomes increasingly scarce because ever higher percentages are spent on salaries and wages. As far as ASAL is concerned the situation may be rendered critical by Government's policy of directing available funding to the most productive (i.e. high potential) areas. Development of the ASAL areas is likely to be dependent on donor grant financing for the foreseeable future, but Government's responsibility is to ensure that it provides sufficient of its own funding to keep implementation capacity available. How much this implies remains to be quantified.

### Selected Government Institutions Operating in ASAL

3.3 Apart from the Ministry of Planning and National Development (MPND), the principal government institutions concerned with productive development in the ASAL areas are: Ministry of Agriculture (MOA), Ministry of Livestock Development (MLD), Ministry of Water Development (MOWD), Ministry of Environment and Natural Resources (MENR), The Ministry of Energy and Regional Development (MERD) and the Ministry of Culture and Social Services (MCSS).

3.4 MOA is very active in areas of better potential. Two major programmes are in operation: National Extension Project (NEP), which uses a training and visit system to promote crop and animal husbandry, <sup>1/</sup> and soil conservation which uses the same field staff and has priority use of 35% of staff time. The necessary staff cadre including subject matter specialists and training officers are in place at District level and there is a full programme of work. In transitional Districts the high and medium potential areas get most of the attention. Even though staff is available at Division and location level, MOA would appear to be facing a situation in which there is little spare capacity and less funding to implement programmes in the drier areas. Not surprisingly MOA has no package to extend in zones V-VI, nor for the moment does it have a programme to promote moisture conservation which is a prerequisite for improving agriculture. In its absence attention is given to irrigation where schemes exist or to possible irrigation development where they do not.

3.5 Agricultural research in ASAL areas has historically been centred at Katumani and Kiboko with a number of additional outreach stations many of which double as stock multiplication farms. Although little has been done on moisture conservation outside zone IV, a considerable number of results have been obtained which concern both food crops and grazing development. Unfortunately there has been no adequate follow-up. The ideas have not been sold well by research, and have not been adapted by extension. Research is about to receive major assistance under a multi-donor project and will introduce moisture conservation as a major topic. Whilst this is undoubtedly a good move, ad hoc work with moisture harvesting and evidence from other East and West African countries (eg. Somalia, Burkina Faso, Niger) is sufficient to allow programmes of adaptation to proceed without waiting for Kenya's own research experience.

3.6 MLD is manned down to division, location and in some places, sub-location level, but for the moment its programmes have received a major setback with the failure of the livestock development projects which it had a major part in implementing. At present efforts continue to form and help run group, commercial, cooperative ranches and grazing blocks and to develop water, dips, etc. as necessary. Major attention is given to a number of apparently minor, but important mini-projects for bees, small stock and cattle upgrading. The extent to which the hides and skins improvement services are active is unclear, but the livestock marketing service is moribund for the moment pending possible financing from the ADB Sheep and Goat Improvement Project. The ASAL areas will receive limited support from the IFAD/WB Animal Health Project.

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<sup>1/</sup> whether this continues to be the case now that MOALD has been divided into MOA and MLD is unclear.

3.7 MOWD has a major role in providing stock and domestic water supplies in the ASAL areas. Despite having much equipment on its books it faces implementation problems due to poor maintenance aggravated by lack of design capacity and inadequate funding at District level. Poor revenue collection hinders its ability to demand funding from the Treasury to maintain and service water supplies which are already in place or indeed to make the case for the release of such development funds as are available to it.

3.8 MENR is responsible for forestry activities. In ASAL the Forest Department's main concern is protecting state forests and reforestation; capacity to popularize on-farm tree planting appears very limited.

3.9 MERD has responsibility for the Development Authorities serving the Turkwell, Tana and Athi River areas as well as the Lake (Victoria) Basin. The primary purpose of these Authorities is to plan resource use in their area of influence, however they are also involved with project development and management to some extent.

3.10 MCSS organizes groups for soil conservation, construction and maintenance of water points and community development; it also promotes income-generating activities for women's groups and rural youth. Staff reaches down to division, and sometimes location level (the latter paid by local authorities), but implementation capacity is severely constrained by lack of funds.

#### The Donor-Supported Projects

3.11 Existing donor support for ASAL development is substantial. Eleven donors are supporting 12 ASAL projects covering parts of 15 districts, with a combined budget of US\$7.5 million for 1985/86. All but one are area development projects. By now, the only districts which are not taken up by donors are those with the lowest population density and the least potential for cultivation (Mandera, Wajir, Garissa, Marsabit and Tana River), apart from a few high and medium potential districts having only a fraction of their territory in marginal and semi-arid lands. In addition, there are at least 10 more area-based agricultural projects in ASAL districts (including Garissa and Marsabit) which for one reason or another do not fall under the ASAL umbrella. On top of this, there are two national projects which operate throughout ASAL areas (animal health, small-scale irrigation) and three which concentrate on zone IV (extension, soil conservation, forestry). There are also a considerable number of Non-Governmental Organizations (NGO's) active in the ASAL areas.

3.12 Management and activities of the major projects are analyzed in a series of matrices in Annex 1. No two projects are alike but nearly all donors support water development, crop and livestock production, soil conservation and afforestation. More than 12 ministries are involved in project implementation and most ASAL Projects involve the Ministry of Planning and National Development (MPND), the Ministry of Agriculture (MOA), Ministry of Livestock Development (MLD), Ministry of Water Development (MOWD), Ministry of Environment and Natural Resources (MENR) and the Ministry of Culture and Social Services (MCSS). In most cases, MPND is responsible for interministerial coordination; in two cases, MOA has this responsibility.

3.13 The 10 agricultural projects outside the ASAL Programme differ in their management: several are implemented by MOA; others by the Regional Development Authorities or the Ministry of Land Settlement. Each of the national projects is implemented by a single ministry: MOA (extension, soil

conservation, small-scale irrigation), MLD (animal health) or MENR (forestry).

3.14 In the early years, ASAL Projects suffered from: lack of a coherent strategy (each donor did as it pleased); lack of exchange of experience between districts; heavy emphasis on long range research and development relative to concrete action at grassroots level; lack of people's participation (district institutions were bypassed); inadequate interministerial coordination; inability to get more than a fraction of project funds into the line ministry budget allocations; insufficient and slow release of ministry funds at district level; slow disbursement of project funds and paralysis of action on the ground.

3.15 Since 1983, projects have increased the emphasis on production relative to surveys and investigation. However, in the absence of beneficiary-acceptable technical packages, the share of funding absorbed by agriculture remains small (eg. in 1986/87, 60% of the Machakos budget will go for water development, while extension, agronomy, livestock and soil conservation receive only 25%). Responsiveness to local priorities has increased as ASAL projects come under district focus (see below) and people's participation is greater. Nonetheless, many problems remain.

3.16 In transitional districts major problems concerning staff and resource allocation to zones V-VII are common, because most of the emphasis is given to areas of highest population density and agricultural potential. The problem is exacerbated by the dearth of proven technical packages for zones V-VII. Despite burgeoning staff resources, MOA has been unable to provide adequate support for some ASAL projects. Water development components have outstripped MOWD's design and implementation capacity.

3.17 The majority of projects have dealt with bottlenecks in local implementation capacity by bypassing the Government system: financing up to 100% of line ministry contributions through direct payment, utilizing expatriate advisors for direct execution of works, establishing separate mechanical units or hiring Kenyan short-term contract staff outside the line ministries. The net result has been an accelerated pace of implementation in the short run at the cost of long-run sustainability.

#### Lessons learned

3.18 ASAL Projects work better when they are coordinated by MPND (rather than MOA) and when they cover a district (rather than a division or several districts). Interministerial coordination has been easier to achieve through the District Development Officer (DDO) than through committees at national level. When project activities are identified by the District Development Committee, this introduces a bias toward areas with highest population density (non-ASAL or zone IV), and toward infrastructure projects.

3.19 The level of project accomplishments is much higher when donors resort to prefinancing line ministry contributions through direct payment, using expatriate advisors for direct execution, establishing their own mechanical units and recruiting contract personnel outside the government system, but local implementation capacity is not strengthened. When outside funding is withdrawn, achievements fall to past levels.

3.20 Development of technical packages has a longer gestation period than other types of action. Thus many ASAL projects which are coming to the close of their first phase have not had time to develop viable packages for zones V-VII, much less diffuse them to the target group. In spite of this, donors have been under pressure to phase out technical assistance in

agronomy. However, premature termination of TA is likely to minimize the eventual pay-off from what has already been started.

3.21 Projects which deliver inputs to groups (self-help groups, women's groups) as opposed to individuals have wider outreach, lower overhead costs per beneficiary and better spread effects to the poor. There is a direct positive correlation between self-help mobilization and sustainability, and a negative correlation between food-for-work and sustainability. Willingness to provide self-help labour depends on whether the participants see tangible benefits (such as food security, higher income, reduced drudgery). Strengthening groups' self-reliance and ability to continue activities, maintain/repair works and solve routine technical problems on their own takes the burden off line ministry staff, saves time and transport costs, and improves sustainability.

#### The Influence of the District Focus Policy (Annex 4)

3.22 There has been a gradual move towards making the District the focus of development in Kenya since independence. District Development Grants were made available in 1971, the rural works programme introduced in 1974 and the Rural Development Fund created in 1975. District Development Plans were also produced in 1975 for the first time. In 1983 the District Focus Policy was introduced. Under this policy District Level planning capacity was strengthened, the authority of District Officers for managing financial and procurement matters was expanded, and better integration of line ministries at district level was sought. The stage was set for initiation of development activities by beneficiaries against a background of financial discipline which included forward budgetting and expenditure limits. District Development Committees were revitalized and Division, Location and Sublocation Development Committees were established. A District Executive Committee chaired by the District Commissioner and made up of the district heads of line ministries, local authorities and parastatals, became the management centre for district affairs.

3.23 To support the District Focus Policy, District Development Officers have been assigned, District Accountants are being upgraded and District Internal Auditors are being deployed. Planning capacity however is confined to the District Development Officer and although an assistant may be posted at a later date, line ministry planning capacity at the district level is deficient. Certain ASAL projects are providing support to help overcome this problem.

3.24 Some existing ASAL projects have always channelled their funds through the government process. Others which have historically funded their projects outside the government process are being requested to provide funding through the appropriate government channel. This is now being done but in many cases the full foreign funding allocation which is available cannot be reflected in the budget because of budgetary ceilings.

3.25 Despite all round willingness to honour the district focus policy a very high percentage of the government budget concerned with salaries, staff support and maintenance of existing structures is controlled by the line ministries at central level. Funding for new structures of various sorts increasingly reflects stated district priorities. There has been progress towards tailoring district expenditure to comply with the district focus, but to date little progress has been made towards tailoring fund release mechanisms to reinforce the policy.



3.26 There are two major exceptions to the above. These are the EEC Micro Project Fund and the Rural Development Fund under which districts have important decision making powers with respect to project selection, siting and sequencing initially for infrastructure such as Rural Access Roads and Rural Water Supplies but more recently for production projects. Expenditure by these funds increased from 2% of the development budget in 1976 to 8% in 1986, but is reported to be constrained from rising further by lack of implementation capacity at the District level.

3.27 This raises an important point which will need to be addressed as the District Focus Policy is progressively implemented for not only is technical capacity limited in the District but so also is the capacity to exercise financial control and to audit usage. It is the intention of Government to strengthen planning capacity within the District, and to appoint District auditors. During the past two years, district treasury staff and DDC members have been trained; gradually the training will reach down to division and location levels. Presumably arrangements will also be made to provide external audit.

#### IV. POSSIBILITIES, ISSUES AND OPTIONS FOR PRODUCTIVE DEVELOPMENT

##### Moisture Conservation (Water Harvesting)

4.1 Annex 9 (Agriculture) concludes that improved moisture conservation for crops is the best way to raise production and increase food security. Other improvements make no sense until risk of crop failure is reduced. In agroecological zone IV, fanya juu terraces are an effective means of conserving moisture because they decrease run-off losses and during the period of bench formation also serve to concentrate water in the vicinity of the terrace. But as rainfall becomes more marginal (zones V-VII), there is a need to concentrate rainfall for crops if secure harvests are to be obtained. Fanya juu is the major plank of the ongoing National Soil Conservation Programme which operates in the medium to high potential areas (zones IV or better). There is at present no national initiative for soil or moisture conservation in zones V, VI or VII (where concentration of moisture is almost a prerequisite for growing crops).

4.2 "Water harvesting" refers to a variety of techniques for concentrating water for crops, which are described in Annex 7 (Water Development); they include water spreading, spate irrigation, run-off harvesting with permanent structures (trapezoidal bunds, semi-circles, contour bunds, microcatchments), or temporary structures (tie-ridging in fields, trash piling along contours) which can be situated within the cultivated area, or external to it, or both.

4.3 Perhaps the most salient feature of the water harvesting experience in Kenya to date has been late realization that schemes stand the best chance of success if they are tailored to the existing experience and constraints of smallholders and pastoralists whom they are intended to assist. Water spreading (spate irrigation) schemes which require maintenance and management during the crop season may be unsuitable in Turkana where the people are largely itinerant and used to chance cropping in areas subject to natural flooding. They have yet to be tried on the Njemps flats or elsewhere where there is a history of supplementary irrigation by simple offtake from relatively large spate rivers. Conversely large structures (trapezoidal bunds) capable of increasing the area of natural flooding may be socio-culturally more suited to the Turkana, who chance crop following

natural flooding. They also may be suitable elsewhere in zone VI and possibly VII where similar conditions and people who use similar planting practices prevail. In zone V where chance cropping is replaced by shifting cultivation or even stable agriculture much of the work carried out to date has involved field structures which have to be rebuilt annually during land preparation when labour is in particularly short supply. There has been some move towards off field catchments but there has been no attempt as yet to use large structures with low annual maintenance requirement to overcome labour constraints.

4.4 It is much to the credit of individual projects and their staff that a start has been made on water harvesting, but against a background of continuing famine relief and increased chance cropping a much broader initiative orchestrated at the National Level is called for. Government has already recognized the potential impact which water harvesting could have by extending the mandate of the Dryland Research Station Katumani to cover the topic under the forthcoming National Research Project. This is essentially a long-term initiative which should preclude the need for research in individual ASAL Projects. SIDA is considering a pilot water harvesting programme under its next tranche of assistance to the Soil Conservation Service MOA. It is doubtful if this is sufficient considering the magnitude of the food security problem and the potential that exists. Enough is already known technically to permit a far reaching programme designed to familiarize farmers and croppers throughout the ASAL areas with water harvesting and to obtain feedback to allow modification to satisfy local preference.

4.5 Technical possibilities. For run-off harvesting existing experience points towards a permanent low-maintenance structures programme, rather than a programme which alters in-field spatial arrangements. Technically both are equally valid in zone V where catchment: planted areas ratios will be of the order of 2:1, but structures are the only valid approach in zones VI or VII. Trapezoidal bunds, hoops and contour ridges which 'syrup pan' moisture down the slope or have spillways or allow water to filter through in stony areas could be demonstrated. Modification of present fanya juu designs and methods could be used for contour and hoop construction. The source of run-off to be concentrated may be either in field or from an external catchment. The choice of source will affect the density of construction but whichever system is used the entire field area should be planted. Whilst this will lead to a patchy crop the worst parts should be no worse than neighbouring untreated fields whilst the best should be considerably better.

4.6 Spate irrigation could be demonstrated particularly in zones V and VI where there are sedentary populations to take advantage of and manage the additional water. The simplest of the designs tried in Turkana or fail-safe designs which deliberately leave part of the diversion structure weak could be used.

4.7 Constraints. The main constraints are not technical but socio-cultural and institutional. Feedback is needed on farmers' reactions to the various techniques; this in turn hinges on institutional support for demonstration and adaptation. Lack of trained subject matter specialists would necessitate slow build-up of the area to be covered initially. Possible shortage of construction labour is another constraint which needs to be addressed.

4.8 Issues. A strong case can be made for a widespread moisture conservation/water harvesting initiative, which would require sectoral support and a source of funding at district level to finance beneficiary uptake. Policy questions would need to be addressed to decide how

implementation should be managed, whether subsidies should be used and possibly whether linking water harvesting development to water supply development would serve a useful purpose. There are a number of arguments for and against the use of mechanization in any construction programme in the ASAL areas leaving aside the vexing question of operating efficiencies. But it would appear that if labour is a major constraint the use of machinery to assist with popularly demanded structures would be justified provided people can maintain them by themselves.

#### Irrigation

4.9 Twenty-six thousand hectares are irrigated in Kenya at present of which 7,000 ha are small-scale schemes in the ASAL areas. Government sponsored large scale schemes are under the jurisdiction of the National Irrigation Board NIB, while small scale irrigation is under the Land Development Division MOA.

4.10 Despite the apparent attraction of an irrigated solution to problems of food security in the ASAL areas there are a number of salutary lessons in the Kenya experience to date. Undoubtedly the irrigation schemes which are most successful are traditional schemes which were spontaneously developed by local people using indigenous techniques to provide a supplementary source of water for crops traditionally grown in the area. Limited assistance has been provided to many of these schemes to provide lasting solutions to problems which the irrigators have only been able to solve on a temporary basis without assistance. Because the schemes were locally initiated they are generally gravity flow, with simple structures, and low, non-labour maintenance requirements.

4.11 The least successful are schemes which have been designed to use the existing physical resource, have needed to attract settlers from outside, and which have relied on pumped water supplies. Both large and small-scale schemes of this type which were set-up to assist drought affected areas have major technical and social problems and a very high cost. The basic problem appears to have been to consider irrigation as more than an aid to subsistence cropping in adverse conditions. This in turn was aggravated by ever increasing sophistication (often to overcome unforeseen technical problems associated with unstable rivers, flash floods and high silt loads). The need to introduce cash cropping (to defray maintenance costs) with the associated problems of marketing removed the schemes from their original purpose of improving food security.

4.12 The cost of irrigation development ranges from US\$25,000 per ha for recent large scale schemes (Bura) and US\$ 19,000 per ha for small scale schemes with high technology and mechanization to as little as US\$400 per hectare for simple technology designed to support existing traditional schemes. Further investment in large scale irrigation is unlikely to be attractive pending resolution of the several problems affecting recent schemes. There is some 20 years experience with small scale irrigation development, much involving (largely unsuccessful), high cost schemes, many of which are or are about to be rehabilitated, often by conversion from pumped to gravity flow schemes with basin irrigation suited to local subsistence crop mixes. There are stated to be a further 17,000 ha suitable for the development of small scale irrigation schemes. It is unclear how much of this is in the ASAL areas, or to what extent site conditions are suited to irrigation. Major complicating factors are erratic seasonal stream flow exacerbated by up stream clearing, decreasing stream flows due to increased up stream water use, and high silt loads in addition to normal considerations of land suitability, ownership, irrigation organization and so on.

4.13 Assistance to irrigation has its part to play in improving food security in the ASAL areas. But there are a number of drawbacks. The area for development is very limited, the number of families who can be assisted are less than 1% of the existing ASAL population, the cost per beneficiary family is high, possibly US\$10,000 drawing on past experience, and site conditions in ASAL have proved difficult. Recognizing the foregoing government has immediate plans for rehabilitation rather than new construction.

4.14 Technical Possibilities. Assistance should be limited to simple actions which might include: scheme design or redesign, intake stabilization using gabion baskets, design assistance to allow flushing of silt loads, land levelling, distribution system improvement including simple structures.

4.15 Constraints. Because the assistance will be small-scale and the solutions site specific the Small-Scale Irrigation Branch MOA may have insufficient qualified manpower at Provincial level; there is no staff concerned with irrigation at District level and no funds for rehabilitation except from donor projects..

4.16 Issues. Criteria would need to be developed to limit expenditure per ha. This issue should be considered taking into account likely expenditure levels which could be justified for water harvesting as water harvesting and supplementary irrigation would directly compete for funds.

#### Domestic and Livestock Water Supplies

4.17 Background. There are a great number of proven methods for providing water for domestic and stock consumption under Kenya conditions. Details are provided in Annex 7. Costs vary from US\$10 to US\$90 per person served. Least initial cost solutions combined with low maintenance costs suited to the prevailing conditions are the ideal solution. High maintenance costs combined with difficult maintenance requirements, such as spare parts or fuel in isolated areas should be avoided. Solar energy and windpower provide possible but unproven alternatives in these circumstances.

4.18 The demand for domestic water supplies continues unabated and Government has ambitious plans to provide domestic water points within at most 5 km of every household by the year 2000. Livestock water supplies are also in great demand but there is as always a trade off between making water available and range condition. A strategy to optimize the density and management of range water supplies does not appear to have been worked out. In the absence of adequate maintenance water supplies are only available in an area for a limited number of years after construction either because of siltation of pans and dams or because of mechanical breakdown in the case of boreholes equipped with pumps.

4.19 Capital, largely donor grants, for construction is probably available in adequate amounts to keep the limited planning and construction capacity of both Government and private sector fully occupied. Lack of construction capacity is aggravated by: demands for maintenance and repair; slow and complicated procedures for the release of funds; lack of maintenance funds exacerbated by failure to collect water charges where appropriate.

4.20 In view of the above Government now lays great emphasis on beneficiary participation in both construction and maintenance. This approach is certainly both popular and practicable for small domestic water supplies serving a limited number of families. To date these supplies have

been constructed with MOA assistance. It is less applicable to major works which are carried out by MOWD as organization of beneficiary participation in construction and maintenance is difficult. A satisfactory approach to beneficiary participation in the construction of livestock water supplies remains to be found. There are even moves to abandon the need for ranchers to raise funding to install stock water supplies in group ranches and grazing blocks although these are already subsidized. It is clear that in the prevailing situation of adequate donor funding for capital development the major requirement is to obtain suitable recipient commitment to maintenance either in cash or physical terms or a combination of both.

4.21 Technical Possibilities range from sand dams and weirs which are easily constructed with local labour, pans and dams which require some form of mechanization, to ground water exploitation either using shallow wells or boreholes. For the most part, simple and effective solutions to the water supply problem exist although there are some areas where ground water is saline and soils are unsuitable for dam construction.

4.22 Constraints. For the most simple possibilities, such as sand dams, suitable site selection and organization of beneficiary groups to help with the work and undertake subsequent maintenance are probably the major constraint. For more expensive developments the foregoing remains a constraint but is complicated by lack of design capacity, poor machinery maintenance and lack of spare parts. Overall there are difficulties of supervision and control in the isolated conditions. Although implementation can be extended by using the private sector they too face problems of spare parts and control in isolated areas.

4.23 Issues. For domestic and stock water supplies the issue relates to who pays for what and to what extent. There is a case for continuing to subsidize the construction of domestic water however once supplies are in place, charges either in cash or in labour for maintenance must be agreed. The alternative is an insatiable demand for construction and rehabilitation.

4.24 For livestock water supplies an additional issue concerns suitable provision of water in relation to the available grazing resource. This implies considerable survey and planning prior to construction and the development of basic guidelines (criteria) concerning the density of permanent and temporary water supplies in various ecological conditions. It is doubtful if adequate data is available to develop these criteria except in limited areas.

4.25 A third issue concerns the possible use of the private sector to develop and exploit water supplies commercially. Whether such a policy is feasible is unclear but it is clear that its consideration should be dependent upon strict rules and regulations being laid down to prevent exploitation.

4.26 Water supplies are an emotive issue and there is evidence that desire for water can be harnessed to bring about other development, including for example watershed protection. There may be possibilities to extend this idea to productive works in areas where people are reluctant to take up moisture conservation activities. There would appear to be a need to examine in more detail the case for linking the provision of water supplies and the subsidies which are being provided for this purpose to other activities of a conservation or productive nature as a general policy.

## Livestock

4.27 There has been major emphasis and investment in an attempt to increase productivity from the Kenya range over the past 20 years. Initiatives have included land adjudication, establishment of group, cooperative, and commercial ranches and grazing blocks, improvement of water supplies, disease control and marketing. By and large the initiative has been a failure to date. The reasons, which are many, are documented to some extent in Annex 8 but in more detail in the documents to which the annex refers. However, it would appear that until such time as well targeted incentives to bring management of the range lands under control can be identified large-scale interventions in the range areas should not be contemplated. In any case if available figures relating to stock ownership are credible initiatives designed to improve the range areas will be to the immediate and ultimate benefit to at most 40% of the pastoral population who own most of the livestock. These are not the families which have food security problems but those who already have adequate resources to see themselves through bad years and to finance their own development when they consider the time opportune.

4.28 Despite the lack of justification for large-scale investment in the rangelands there are a number of local situations which require urgent attention. Assistance to arrest de facto degradation of the resource is required in areas such as permanent water holes and police posts where there is a high risk of destruction of grazing in the medium to long term.

4.29 There is no apparent existing support for animal health in the ASAL areas outside the foreseen control of contagious disease such as rinderpest and contagious bovine/caprine pleuro pneumonia. Further investigation is required to determine the extent to which future ASAL initiatives especially those designed for category A districts should support improved availability of veterinary services and drugs for pastoralists, bearing in mind the need to avoid overlap with the Government Animal Health Support Project.

4.30 Livestock marketing from the ASAL areas used to receive Government support. This was phased out as it was proving uneconomic. An ADB project designed to support sheep and goat marketing was designed but its current status is unclear. There is a need for a complete review of the situation. Domestic demand is increasing for meat from the ASAL areas for fresh consumption rather than canning. Current marketed produce often bypasses the veterinary checks and controls imposed some years ago. Despite the increasing demand there is reported to be a considerable, unquantified margin between producer and consumer prices which may encourage producers to move their own stock to major market centres. Minimum intervention in marketing should include collecting and publicising market prices at major buying points so that at least producers can bargain more strongly at the local level.

4.31 In zone V, there is scope for integrating livestock in the farming system (introduction of ox-ploughing, manure use). Livestock activities which do not compete for grazing and browse resources should be encouraged to the maximum. For activities such as beekeeping and hides and skins improvement, problems may be encountered with marketing the produce and obtaining adequate prices in isolated areas. Additional action may be required to assist producers in this respect. Although government extension programmes are already in place to a great extent, it is unclear whether adequate funding is in place to promote development. Other activities which do not compete for the range resource but which need feed supplies from elsewhere, such as poultry keeping, should be approached with caution and only promoted where feed supplies can be guaranteed and market prices are

attractive, i.e. near towns, and then only after careful review of the prospects.

4.32 Technical possibilities. To deal with the above problems and to provide general assistance to livestock production a number of possibilities can be considered. These include programmes designed to:

- improve grazing and browse resources in high risk areas by encouraging grazing management, range improvement, browse and pasture development.
- increase the availability of drugs in zones VI and VII.
- integrate livestock into the farming system in zone V.
- provide market information to pastoral producers.
- encourage livestock activities which do not compete for browse or grazing.
- open up, or enable dry season utilization of range by improving water supplies (Annex 7).

4.33 Constraints. Many of the technically possible solutions to improved livestock production in the range areas have been tried in the past and found wanting. New approaches are desperately needed and should be sought before any further major investment in livestock activities is considered.

4.34 Issues. Should money be invested in livestock development when it appears that events have overtaken the poorer segments of the pastoral community who are turning increasingly to crop production and other activities? Given the existing and probable future limited availability of government funds it would appear that the answer should be no, except perhaps for relatively minor investment to alleviate critical local situations or promote livestock activities which do not compete for browse or grazing.

#### Agriculture

4.35 Limited crop breeding and agronomic work has been carried out particularly for zones IV and V for maize, sorghums, millets and legumes. In both these zones there is a move away from those crops which are suited to conditions of low and erratic rainfall towards maize which demands less labour to grow and process. This move, which increases the risk of crop failure, is accelerated by marketing systems which are designed to purchase, process and supply maize and which appear to actively discourage, through adverse pricing the growing of the minor cereals, and by a seed production policy which concentrates heavily on improved maize varieties. In spite of this there is a demand for improved varieties of bird resistant millets and legumes. Seed supplies are a major problem. A smallholder based seed production programme, possibly Government sponsored and in conjunction with one or more of the seed companies which operate in Kenya would appear to be an attractive proposition for zones IV, V and possibly VI.

4.36 As cropping increases in importance in the ASAL areas, there will be a need for more satisfactory on farm storage for sedentary families, and for the control of storage pests. This applies particularly to the areas where sorghum, grams, cowpeas and pigeon pea are grown. In addition to saving in-store losses, local fabrication of storage containers could

provide a minor source of local employment but may also lay the foundation for marketing systems designed to take advantage of seasonal price fluctuations particularly for the legumes.

4.37 Technical Possibilities. In the absence of soil moisture improvement, any other agronomic development possibilities are likely to be worthless in most years in zones V-VI. Purely agronomic methods of improving soil moisture including rearrangement of plant spatial distribution or incorporation of manure do not appear to be acceptable to farmers for the moment. Sequential agricultural development is proposed:

- soil moisture improvement.
- soil fertility improvement.
- improved crop storage.
- improved seed production.
- improved crop husbandry.
- development of mixed farming.

Put together these form the components of an extension programme. The prerequisite is soil moisture and this is where the initial priority of the extension services should be.

4.38 Constraints have been discussed earlier under moisture conservation.

4.39 Issues. In zones V-VII, extension services do not merit any support unless there is an effective water harvesting programme.

#### Off-Farm Income-Generating Activities

4.40 Three Government Institutions are involved with promotion of off-farm income-generating activities. Kenya Industrial Estates offers subsidized loans, skills training, extension services and subsidized centralized infrastructure to rural entrepreneurs. The average size of loan, 68,500 shillings, disbursed under the regular programme is probably higher than would be warranted in the ASAL areas. The Ministry of Culture and Social Services (MCCS) had 280 Youth Polytechnics (YP) training 25,000 school leavers in 1983. Most of the participants are town dwellers and all have completed primary education. Whilst Youth Polytechnics have been supported by several ASAL projects they have stopped short of generating employment because graduates lack capital to set themselves up in business. At National level MCCS is establishing a line of credit in cooperation with ILO to set up groups of YP graduates in business. A similar programme is about to be set up with CARE. Legal problems are delaying disbursement and further assistance would not appear to be needed for the moment.

4.41 The Women's Bureau MCCS operated an FAO/SIDA project "Community Action for Disadvantaged Rural Women in ASAL Areas". The project faced a number of institutional and technical problems and only reached 17 women's groups. In addition 12 out of the 13 existing ASAL projects promote income-generating activities, 9 of them through the Women's Bureau. The Women's groups have also been assisted through the RDF. Experience in the ASAL areas has been salutary: 7 projects have been financed, 6 have collapsed and 1 is



still under construction. Problems appear to arise through lack of coordination between MCSS and the concerned line ministries.

4.42 NGO's are active in the field of enterprise development. Some are coordinated through the Kenya Rural Enterprise Programme (KREP), a USAID-supported Kenyan NGO which serves as an umbrella programme providing training, credit and technical assistance to strengthen the absorptive and implementation capacity of NGO's involved in promoting income-generating projects. The emphasis is on sustainable development financed with credit. Other NGO's with income-generating projects are OXFAM, CARE, Plan International and Kenya Freedom from Hunger Campaign. A brief overview of their activities is in Annex 10, but they are concerned to a great extent with on-farm activities which may or may not compete for existing scarce resources.

4.43 Technical Possibilities: The Women's Bureau and NGO's promote goat raising, beekeeping, posho mills, handicrafts and rental houses, but the economic viability of existing packages has not been assessed. Even less is known about the technical possibilities for expanding the non-farm activities most widespread among the rural poor (charcoal making, beer brewing, food processing, petty trading, brick making, etc.).

4.44 Constraints: Apart from lack of information on the economics of non-farm activities undertaken by the poor, there are institutional constraints. None of the 3 government programmes is successful. Income-generating projects for women have potential, but the programme would have to be redesigned to enable the Women's Bureau to contract technical support from MOA and MLD.

4.45 Issues: GOK's willingness to support NGO-assisted income-generating projects should be assessed. Credit institutions' willingness to handle such a programme or sub-contract backstopping to NGO's should be explored. If suitable credit arrangements cannot be developed, the programme would have to be launched on a grant basis with beneficiaries raising a certain percentage of the total sum up front in materials, labour and cash savings.

## V. OPTIONS FOR PROJECT OR PROGRAMME DESIGN

5.1 The possibilities outlined in the previous section open the way for several design options. Four alternatives are discussed in this section: area development, sector projects or programmes, ASAL Development Fund and ASAL Programme. To date assistance to the ASAL areas has been mainly in terms of area development projects using a multisectorial approach. These projects have made positive contributions to district development but in the medium to long term, it appears that neither adequate implementation capacity nor budget will be available to sustain initiatives at their present levels, and Government has yet to make any provision to continue selected activities at a certain core level once the projects are phased out.

5.2 Given Government's present, and foreseeable, budgetary limitations, any move towards sustainable development will require considerable beneficiary participation in both capital investment and maintenance. This implies genuine beneficiary demand. For the moment such demand is mainly confined to public, social and infrastructure development (especially

water). The major exception is bench terracing which is perceived as having an immediate effect on crop yield. The implication is that other productive investments remain to be adequately identified and demonstrated or alternatively remain to be adapted to local requirements. In such a situation there is obviously a major role for sectoral support both in terms of manpower development and servicing as well in the development of suitable policies to induce uptake of productive packages. At the same time there is a need to provide development funds which can be used to respond to beneficiary demand for productive on-farm and off-farm investment at district level.

#### Area Development

5.3 This is not only the major orientation of most donor funding in ASAL areas, it is also on the surface the easiest way to provide assistance, both for the donor and government. For the donor, it provides a visible and readily identifiable development action which appears attractive in conceptual terms because a large part of the problems in a specific district are addressed. It can also be a successful approach if particular attention is paid to the institutional aspects and to the development of capacity within government to undertake the development itself and subsequently to be able to sustain development after the withdrawal of the donor technical and financial resources.

5.4 Out of the 27 districts considered to be ASAL in character or to contain major ASAL zones, 15 already have or shortly will have development projects. This leaves the north and east (Mandera, Wajir, Garissa, Tana River and Lamu) and to a certain extent other districts such as Narok and Marsabit. While valid area development projects could possibly be defined for these other districts, under the current circumstances it would not represent the best use of resources and would not address the major constraints in the ASAL areas: (i) how to make better use of donor funds while at the same time helping government to produce an operational strategy and the related development initiatives for ASAL areas; and (ii) how to build-up its ability to undertake development on a sustainable basis. For these reasons, the structuring of a development project focused on one district or area should be resisted in favour of an ASAL wide programme which would provide an opportunity not only for IFAD but for other donors to contribute better to overall development of the ASAL area. Moreover the multisectoral district projects appear to have led to neglect of policy issues which concern ASAL development and to a lack of exchange of ideas between districts, at least as far as production oriented development of zones V - VII is concerned.

#### Single Sector Projects/Programmes

5.5 While additional area development projects might aggravate rather than alleviate the overall problems of ASAL development, a single sector approach could overcome some of the issues, certainly those associated with policy development, sharing experience and staff development. The problem is that despite a relatively large number of options for a single sector approach there are limited possibilities that would justify a full-scale single sector project.

5.6 There has been a general trend, particularly with the World Bank and other multilateral donors, to move away from integrated area development projects into projects which tackle the problems of one sector or subsector - the intention being to simplify the administrative and organizational aspects by working with one ministry instead of many and often within one department of that ministry. The National Extension Project and National

Research Programme are cases in point. Support for small-scale irrigation by the Dutch and for Animal Health Services by IFAD are similar initiatives. Single sector actions could prove more successful than the previous multisector approach, however, it is still a little early to tell. The problem for the ASAL areas is that apart from veterinary services and water development there are unlikely to be any single sector activities which could generate a large amount of beneficiary demand in the short-term. Given the recent split of MALD into two ministries general extension becomes a multisector project unless either crops or livestock are ignored, which is unthinkable except in the case of the per arid ranching areas. Another snag with single sector projects is that it would be difficult to use the demand for water as an incentive to get people to participate in other activities designed to raise production in the area.

5.7 Out of several possible sectoral initiatives which include water harvesting/spate irrigation, irrigation, stock and domestic water supplies, livestock, agroforestry, agricultural extension only water harvesting/spate irrigation merits broad support. Available moisture is the key to all productive improvement in ASAL whether agriculture, livestock (browse and grazing development) or agroforestry. Other reasons why water harvesting/spate irrigation should receive priority are:

- famine relief is costly; food security, in particular the availability of cereals, is the major concern for both inhabitants and Government.
- improvement of livestock or agroforestry is unlikely to have a major impact on food production or incomes of the poorer sections of the ASAL community.
- sectoral support to MOWD for stock and domestic water supplies and to MLD for livestock improvement has been tried and found wanting.
- agricultural extension in the absence of moisture improvement for crop production will have little or no impact.

5.8 On the other hand, some of the disadvantages of a single sector project focussed on moisture conservation are that: it might aggravate existing fragmentation (it would just be one more initiative along side of the SIDA soil conservation and the Dutch small-scale irrigation projects); its leverage in MOA and at district level would be limited; and it risks duplicating the efforts of ASAL projects. Action could be paralyzed by lack of funds at District level to finance on-farm investment and related staff transport. Moreover, it would do nothing to help GOK absorb, sustain and spread the other initiatives started by existing ASAL projects.

#### ASAL Development Fund

5.9 With or without sectoral support, there is a need for continuing finance at district level to respond to beneficiary demand for productive on-farm and off-farm investment (eg. water harvesting structures, non-farm income-generating activities) and ensure the respective technical backup. One way of meeting these requirements would be to establish an ASAL Development Fund under the jurisdiction of the District Commissioner, with the District Development Officer having executive responsibility. They would ensure that the micro-projects to be funded are priority projects for local people and that the line ministries would be coordinated to support their planning, implementation and operation. Budget support would be provided by the Fund to help ensure that the line ministries have funds to provide supporting services.

5.10 There are a number of constraints to the speed at which District funds for the ASAL can be established, and the eventual size and scope of such a fund. These can be summarized as follows:

- limited planning and implementation capacity at the district level;
- limited, proven, production oriented activities to be financed;
- the need to prevent unnecessary overlap with existing RDF and ELL initiatives;
- scarce Government budgetary resources to finance the fund.

5.11 A number of other matters would need to be addressed including the need for adequate audit, monitoring and evaluation of fund activities and the possible need for supporting credit.

5.12 The implication is that if an ASAL Development Fund is agreed it should be carefully thought out and conservatively phased. There will be a need for flexibility. Initial donor financing would be gradually phased out and taken over by Government. The size of the fund remains to be determined, but modest resources should be adequate if the fund is viewed as core financing which will sustain some development activity at the District level in the absence of additional donor support, but which can act as a channel for additional donor support (grants) as this is available.

5.13 It is intended that the proposed ASAL Fund be a government fund with donor support, not a donor fund with government support as is the case with RDF. Thus the Fund must be integrated into the government system and must at some point be sustainable with the Government being able to provide the majority of the funding. This implies that either funds be diverted from line ministry services or that there be some cost recovery or both.

5.14 Another element being considered for inclusion in the Fund's operation is a window for financing micro-projects undertaken by NGO-assisted beneficiaries. This would increase the number of people who could be assisted without increasing government backstopping costs and facilitate the coordination of NGO activities by the district - a goal which has so far been elusive.

5.15 The possibility of operating a District Fund for the ASAL areas oriented towards productive activities without sectoral support would be extremely difficult. There are clear advantages to combining the ASAL Development Fund with a sectoral programme to popularize water harvesting, which is the only realistic way of increasing the numbers of production oriented mini-projects demanded by beneficiaries in the ASAL areas. In the opinion of the mission, a major long-term use of the Fund could be to support water harvesting which once established could develop into a million ha programme in ASAL. In the meantime (pending generation of demand for water harvesting through demonstrations), funds are required to respond to existing beneficiary demand for construction of water supplies, soil conservation, small-scale irrigation, planting material and off-farm income-generating activities.

### ASAL Programme

5.16 Three elements would be necessary in an ASAL programme: (i) an ASAL Development Fund operating at district level and financed through MPND/OP; (ii) sectoral support for the line ministries (primarily MOA, MLD and MOWD) for development of operational capacity and a programme of field level demonstrations of technical solutions and possibilities; and (iii) technical and management support through short-term consultancies and provision of material/equipment at HQ and District to assist in a reorientation of the support services in ASAL districts with the requisite training inputs to make the new systems operational. The intention of this approach is to allow the Government to take maximum advantage of the work and findings of single sector and other technical projects and integrate them into the regular government programmes in suitable districts. Similarly, the proposed approach should facilitate the integration of current area/district development projects through the ability to pick up the most successful development initiatives and finance them through the ASAL fund and by providing a structured programme which future donors could support, even if they wish to continue to associate themselves with specific geographic areas. This would help address the current problem of lack of continuity.

5.17 The ASAL Development Fund would be the core of the programme. It would provide the means to respond to felt needs and to finance actions which are difficult to respond to through regular line ministry services. But it could not operate properly unless the concomitant technical solutions and mini-projects are developed in parallel. This is particularly so because the felt needs of the target group are currently expressed primarily in terms of social infrastructure; production actions require demonstrating to the people so that they become aware of the possibilities and can thereafter select those which respond best to their needs and resources and to which they are willing to commit themselves fully.

5.18 Finally, unless government services are able to demonstrate, and provide technical support for the execution and operation of these actions in a cost-effective manner, within a tight budget framework, many of the mini-projects and development initiatives either never come to fruition or will fail due to poor implementation or lack of key technical interventions during their early operation.

5.19 The advantage of the fourth option, an ASAL Programme, is that it simultaneously helps the Government overcome fragmentation, lack of continuity and sustainability and combines the best features of option two (sectoral support for water harvesting) with option three (a district level fund to respond to beneficiary demand for on-farm and off-farm investment generated by the Programme). The demonstration programme would complement the Fund and vice-versa: the spread of water harvesting would not risk paralysis due to lack of funds to support micro-projects at District level, and the Fund would not risk paralysis due to lack of grassroots demand for productive on-farm investment.

## VI. ISSUES

### Definition of the ASAL Area

6.1 The point is made in the report that AEZ IV which is included in the ASAL areas under the current definition is already regarded for development purposes as medium potential. As such it is already in receipt of production oriented assistance. Redefinition of the area to exclude zone IV would facilitate greater concentration on the particular problems of ASAL and would help to ensure that assistance provided for the ASAL areas was more accurately targeted. A decision on whether the existing definition should stand or whether it should be amended is required.

### Strategy for ASAL Development

6.2 The report suggests that in AEZ V - VII the major problem is food security and that increased livestock production is unlikely to solve the problem, especially for the large number of families which are being marginalized. It is further suggested that that increased crop production and non-farm employment are more likely to provide the eventual solutions. The scenario has major implications for Government funding priorities, the channelling of funds to the ASAL areas, and the coordination of external aid. It requires further examination and consideration by Government.

### Future Resource Allocation for ASAL Development

6.3 Resource allocation will depend on the priority which Government wishes to accord ASAL areas. There are no apparent areas of comparative advantage for development in ASAL areas compared to the areas of high potential, but a case may be made for resource investment to ensure food security and limit urban drift to the extent possible. At the same time Government resources in terms of both money and manpower are needed in the ASAL to ensure an adequate core programme which external grant funds can eventually compliment. The core programme should operate throughout the ASAL areas. Government attention is invited to this major issue.

### Scope of the ASAL Fund

6.4 The ASAL fund should eventually finance all development within the ASAL areas of the District. For the moment there are two other established funds operating in the ASAL areas, RDF and EEC microprojects. Understandably both wish to retain their identity for the moment. To ease administrative procedures and prevent fungibility moves towards consolidation of the three funds should be considered in the medium-term, once the ASAL Programme, which includes the ASAL fund has a proven record of achievement.

### Isolation of Investment Support from Regular Government Machinery and Procedures

6.5 Moves are afoot to bring donor grant support within Government budgetary procedures. This has advantages in that it should lead to an increase of implementation capacity of the technical ministries concerned and eventually, provided the issue is addressed by streamlining procedures, for the release of development funds. It should also enable programmes to continue in the long term. This is the purpose of the suggested ASAL Development Fund which, if agreed, will take time to become operational. In

the immediate future, however, consideration should be given to phasing grant money into the system and allowing a certain proportion to remain outside to overcome constraints to the release of Government controlled development funds which presently occur. Consideration should also be given to providing limited rollover of funding facilities at District level.

#### Training

6.6 The ASAL areas present special problems, especially for agricultural production. The crops best suited to the areas and the most appropriate methods of growing them are completely different to those in the medium/high potential areas. The problems presented appear to be neglected commencing with the training curriculae of Universities and training colleges and reflected in the Government development programmes which are conceptualized. Consideration should be given to reviewing training curriculae with a view to overcoming this problem.

#### Subsidies

6.7 Subsidies are at present used to assist development in the ASAL areas (and elsewhere). They are in a sense hidden from the beneficiaries. Perhaps there is a case for explicit subsidies to be built into development programmes as one method of attracting beneficiary participation.

#### Off-farm activities

6.8 Off-farm activities should only be financed to the extent that they are financially viable, and consequently able to repay the investment. A direct government funding channel may not be suitable for this purpose. Alternative channels do not exist as yet, although attempts to fund through NGO's are being made. This matter requires further consideration by Government in consultation with banks, cooperatives and other credit agencies.

### VII. FOLLOW UP

7.1 It has been agreed between IFAD and GOK that a workshop on ASAL development will be organized for June 1987. Participants in the workshop will include representatives of GOK, bi and multilateral donors and possibly NGO's.

7.2 To develop discussion papers for the workshop, a local preparation group will be set up with representatives from the involved line agencies. It is suggested that the Ministry of Planning should take the lead and that the participating ministries should include Ministry of Finance, Ministry of Agriculture, Ministry of Livestock Development, Ministry of National Resources, Ministry of Culture and Social Services and Ministry of Water Development.

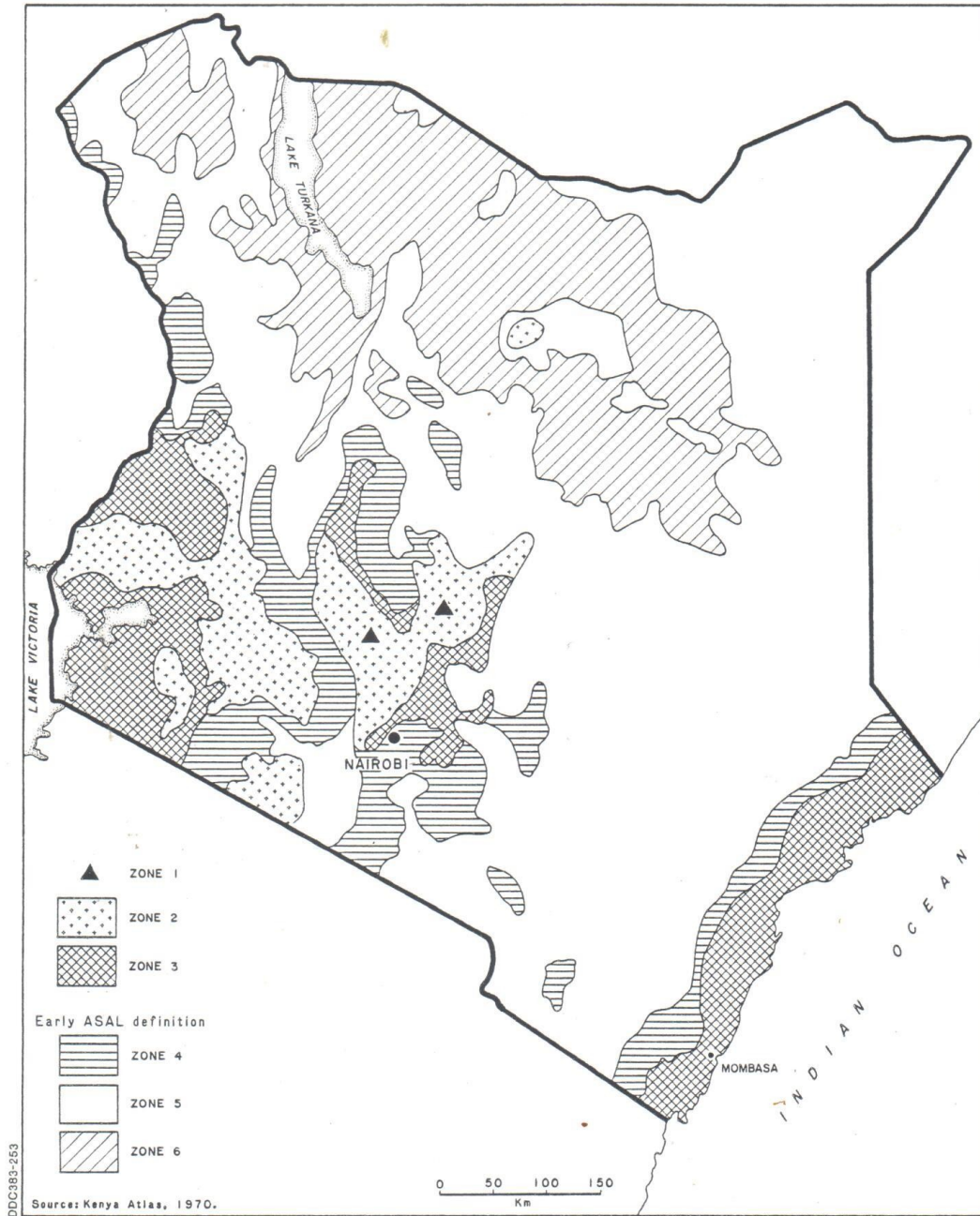
7.3 IFAD has agreed that it could support the activities of the local preparation group. A consultant who could be provided by FAO/IC would be appointed to work full time with the local team. Support funds would be provided for transportation, allowances, graphics, reference material, stationary, etc.

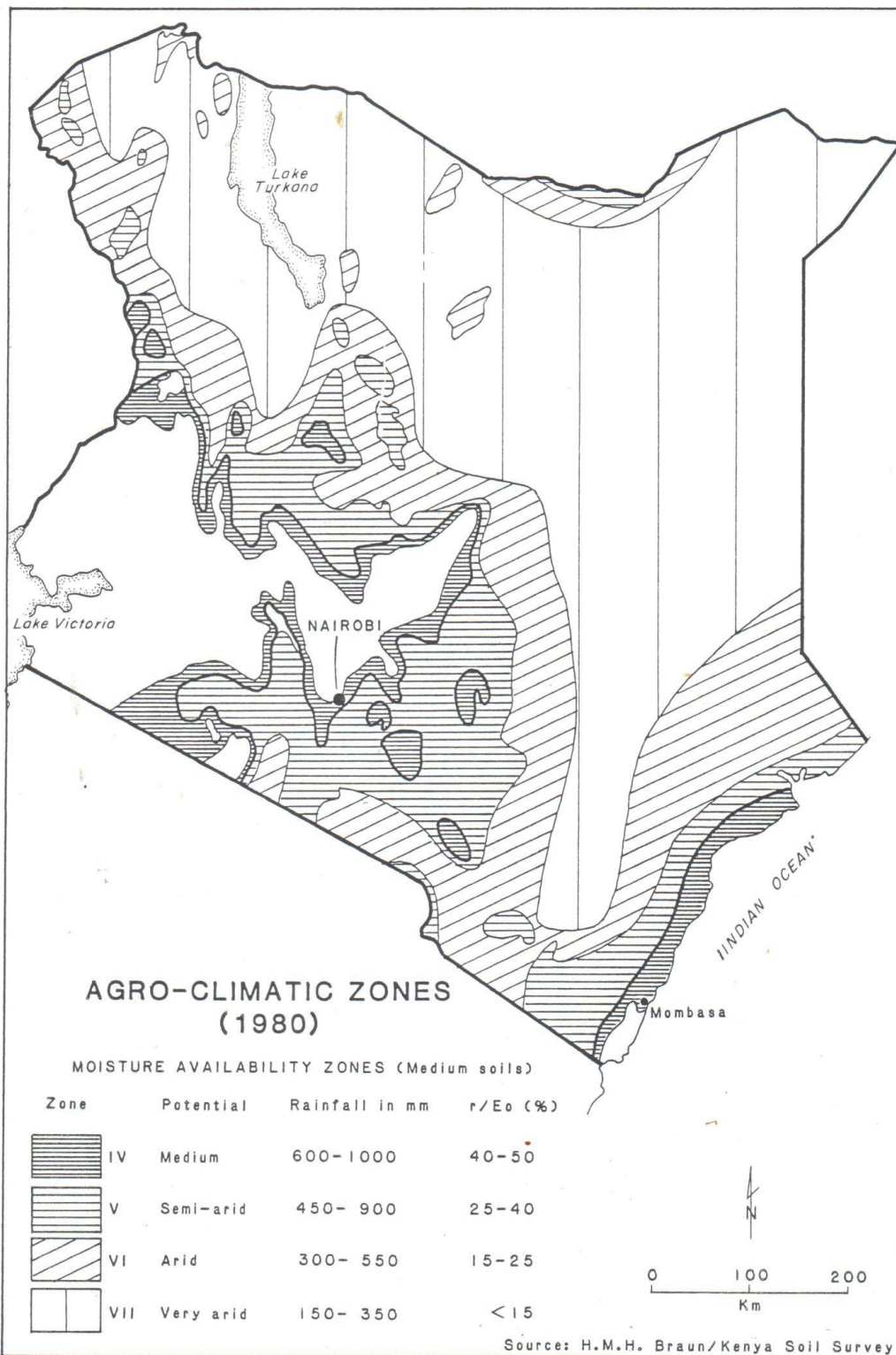
7.4 Terms of reference for the initial work to be carried out by the group and a tentative costing is given in Appendix 1.



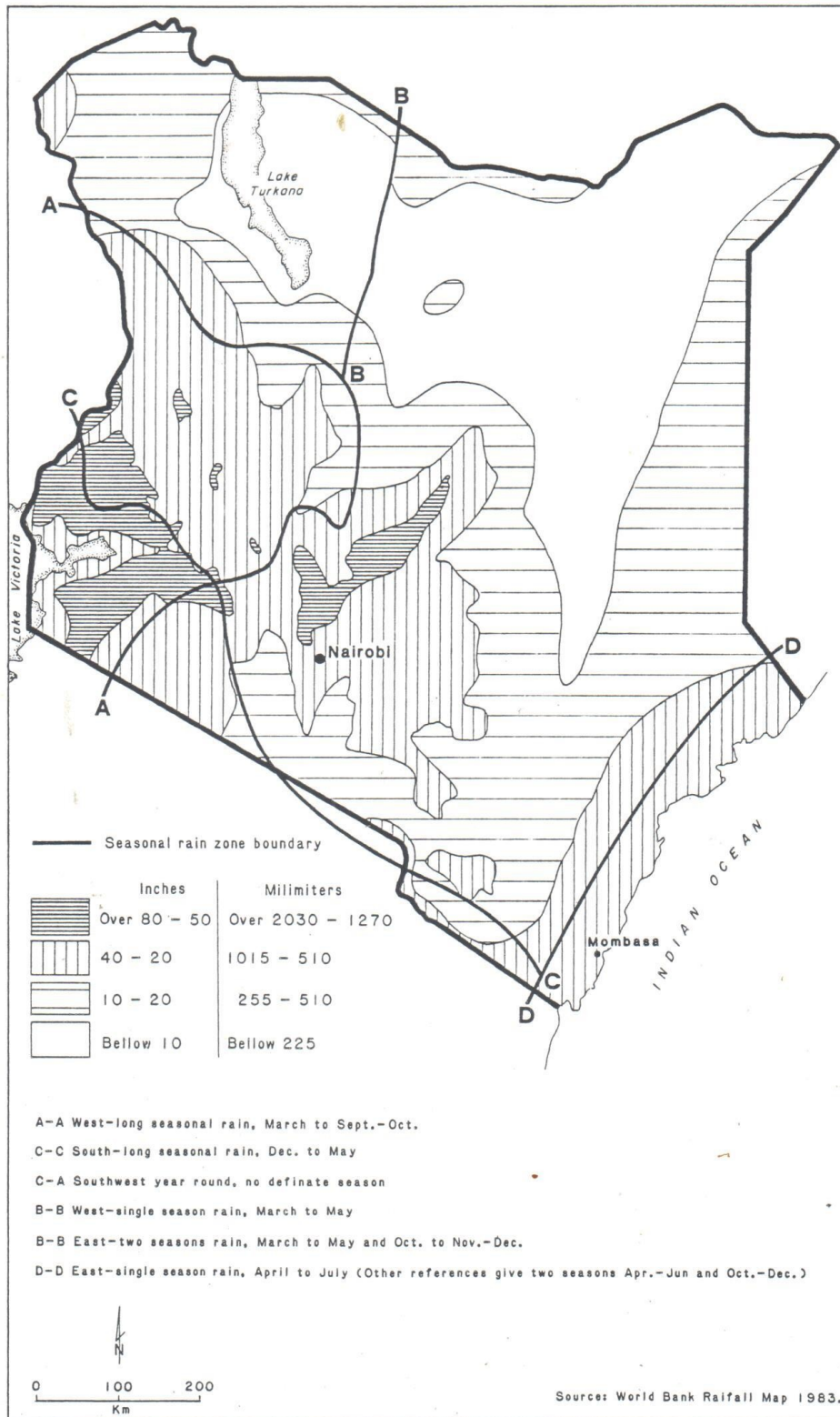
K E N Y A — ARID AND SEMI-ARID LANDS DEVELOPMENT

ECOLOGICAL ZONES



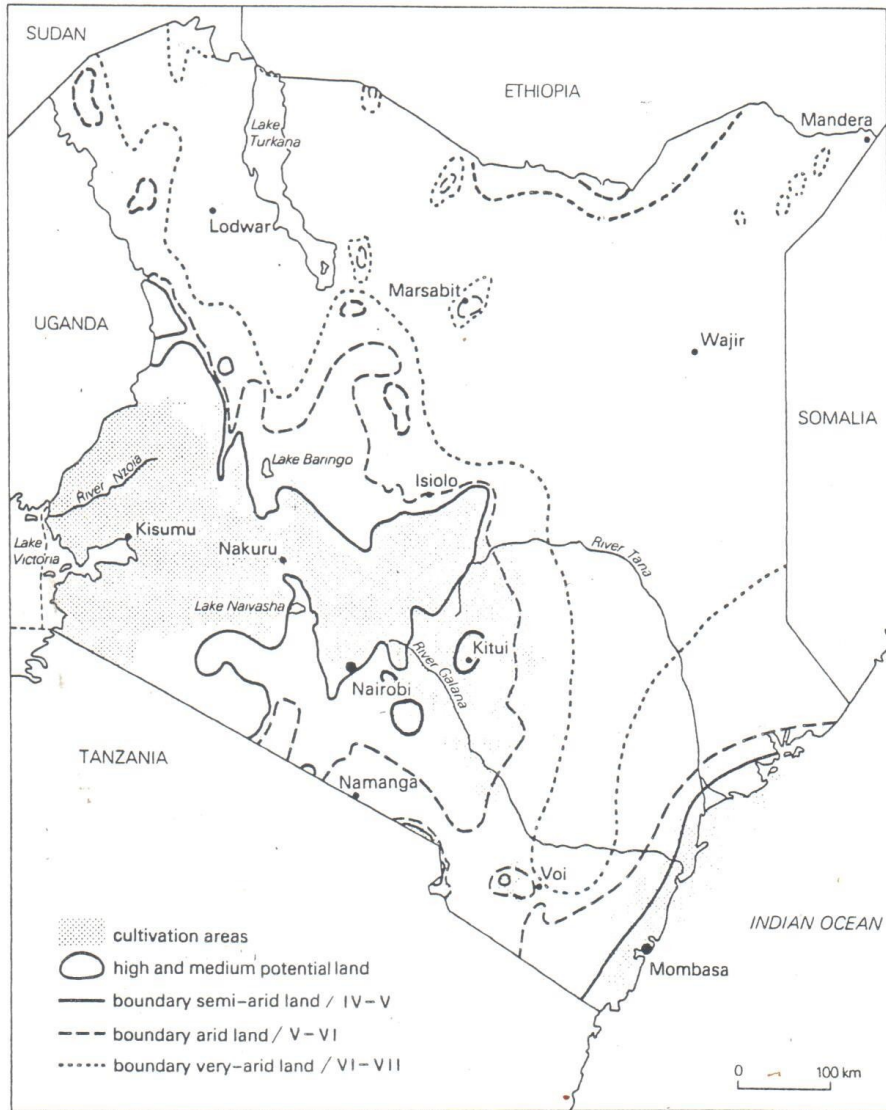


K E N Y A — ARID AND SEMI-ARID LANDS DEVELOPMENT  
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K E N Y A ——— ARID AND SEMI-ARID LANDS DEVELOPMENT

RELATION BETWEEN THE CULTIVATION AREAS AND THE SEMI-ARID AND ARID ZONES 1982



Source: Epp and Kilmayer, 1982

Agro-climatic zones from KREMU

Shifting agriculture now out to boundary zone VI-VII in Eastern Province 1986 along Garissa Rd.

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Appendix 2KENYAARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENTPRELIMINARY SUGGESTIONS FOR A WORKSHOP ON ASAL DEVELOPMENT

1 Government and IFAD have agreed that it would be appropriate to organize a workshop to discuss policy and strategies for ASAL Development. Provisional timing is June 1987. The present Issues and Options Paper would be background material but additional papers will be necessary. In order to prepare necessary documentation for the workshop a local consultant would be appointed. His task would be to arrange the temporary release of suitably qualified personnel by the several concerned Government Ministries, to ensure that suitable discussion papers are prepared, to facilitate necessary travel by the designated personnel; To organize secretarial back-up; and, eventually, to organize the workshop, details of which remain to be clarified.

2 To finance these tasks support funds would be lodged with the appropriate UN agency. A provisional budget is attached which includes support funds for government staff plus secretarial assistance, the local consultant and IFAD/FAOIC support.

3 TOR's for 8 government staff who would prepare the papers are attached, but the budget provides flexibility to allow additional specialized input to the papers should this be necessary.

Appendix 2EXISTING ASAL PROJECTSTerms of Reference

- Object: To compile additional information on achievements of existing ASAL projects and synthesize them in a paper for presentation at the workshop.
- Qualifications: Seven years of experience in project planning, implementation and evaluation (preferably with Ministry of Planning, GOK).
- Terms of Reference: The person selected will gather and systematize information from all ASAL projects regarding achievements, numbers and types of beneficiaries, cost benefit ratios and cost per beneficiary of components in water development, soil conservation, agronomy, forestry, community development, livestock and income-generating activities. The information should be presented in a series of matrices similar to those illustrated in Annex 1.

Appendix 2ASAL DEVELOPMENT FUNDTerms of Reference

- Object: To prepare a paper for presentation to the workshop on ASAL development entitled. 'ASAL Development Fund Possible Approaches and their Implications for Government and Donors.'
- Qualifications: A degree in economics or management with 5 years experience of the design and operation of development funds. The incumbent would be familiar with Kenya Government financial procedures and with social, agricultural and livestock conditions which apply in the ASAL areas of Kenya.
- Terms of Reference: On the basis of available documentation and discussion with Government, donors, banks and beneficiary groups the consultant will examine the several possible options for formation and use of an ASAL fund. Particular attention would be paid to: the size of a possible fund; the extent to which donors and Government should contribute; phased build-up of a fund; the relationship between a fund and credit facilities; the working of a fund at district level; the relationship between a fund and sectoral initiatives by line agencies.

Appendix 2CREDITTerms of Reference

Object: To prepare a paper highlighting the place of credit in developing the ASAL areas of Kenya.

Qualifications

- minimum of 10 years experience in the sector.
- familiarity with savings and credit schemes in Kenya or similar countries in Africa.

Assignment

- review the recent credit history in Kenya paying particular attention to smallholder and agricultural credit.
- review the experience of the Rural Development Fund and the EEC Micro-Project Fund.
- hold meetings with the key credit institutions including inter alia, the Agricultural Finance Corporation, Cooperative Bank of Kenya, KGGCU, Kenya Commercial Bank, Barclays Bank, Standard Bank, non-banking financial institutions and private enterprises such as the input suppliers.
- hold discussions with key officials in relevant ministries, the Office of the President, the Control Bank and district administrations.
- assess the potential for using a savings/credit approach and the success and applicability of savings/credit schemes currently under implementation in the country.
- propose what procedures and type of administration would be required to ensure that the grant and credit portions of the ASAL Fund operate effectively and that the credit is efficiently channelled to the beneficiaries and collection mechanisms are in place.
- determine the implications of the credit and grant facility of the ASAL Fund on government budget ceilings and the effect of government procedures at the district level on operation of the ASAL Fund.



Appendix 2MARKETINGTerms of Reference

- Object: To prepare a paper for presentation to the workshop on ASAL development entitled 'Suggestions for Government Support to Marketing in the ASAL Areas.'
- Qualifications: A degree in economics with at least seven years experience with the functioning of Government and/or parastatal support to marketing. Familiarity with the particular problems associated with marketing of grains and live-stock in remote areas is necessary.
- Terms of Reference: Annex 5 of the issues and options paper reaches the conclusion that Government initiative should be local and basically in support of the private sector. This conclusion should be tested with relevant government and parastatal organizations concerned with marketing in ASAL areas. The reactions should be documented and should lead, together with the annex conclusion to an examination of actions which could be taken by whom and how. The detailed options which result should be presented so as to provoke discussion at the ASAL development workshop.

Appendix 2SMALL-SCALE IRRIGATIONTerms of Reference

- Object: To prepare a paper for presentation to the workshop in ASAL development entitled, 'The Place of Small-Scale Irrigation in ASAL Development.'
- Qualifications: A degree in agriculture or engineering with seven years experience of small-scale irrigation schemes particularly in ASAL areas. The incumbent would have an appreciation of problems associated with development and management of irrigation schemes by pastoral and/or agropastoral communities.
- Terms of Reference: The incumbent would draw upon the considerable data available in Kenya to draw up criteria for the development of small-scale irrigation schemes in ASAL area. Criteria would include site selection, irrigation type (including spate irrigation), structures and on field development and management. Both full and supplementary irrigation would be considered. Suggestions would be made as to the maximum allowable cost per ha. command, the extent to which this should be financed by Government, possible arrangements for repayment, levels of subsidy and responsibility for maintenance. Maximum allowable cost would be compared with alternative engineering developments including terracing and water harvesting which may in certain circumstances be an effective alternative to supplementary irrigation.

Appendix 2LIVESTOCKTerms of Reference

- Object: To prepare a discussion paper to be entitled 'Livestock Development in the Range Areas of Kenya. Reasons for Success and Failure.'
- Qualifications: Degree in agriculture, range management with ten years experience of range development under Kenya conditions. Knowledge of and interest in the organization and motivation of pastoralists in addition to technical skills is necessary. Some knowledge of project design is essential.
- Terms of Reference: Analyse the content, organization and results of large and small-scale livestock projects in Kenya during the past 20 years. Assess actions which have been successful and to the extent possible attribute the reasons for success. Based on the analysis of available documentation and examination of ongoing projects define for discussion purposes design criteria which should be built into future livestock development proposals.

Appendix 2AGRICULTURETerms of Reference

1. Object: To prepare a discussion paper to be entitled "Implications of improving moisture availability for plant production in AEZ V - VII".
- Qualifications: Postgraduate degree in agronomy with at least 10 years' hands-on experience or research experience with the production of cereals and legumes in areas with less than 400 mm of precipitation per crop season. Particular knowledge encompassing sorghums, millets, cowpeas and grams would be desirable. Knowledge of crop response to moisture and the influence of soils is necessary.
- Terms of reference: Following a brief review of the literature relevant to the subject, the agronomist would be expected to review in detail existing experience with moisture improvement and supplementary irrigation in Kenya. The review would include details of the methodology, yields and farmer response to the extent these are documented. Results will be related to the extent possible to existing climatic conditions and soils. The necessity or otherwise and the practicability of organic or inorganic fertilization will be estimated. On the basis of the above, and the excellent soils and agrometeorological data base which is available a possible programme of moisture conservation would be set out. The programme would prioritize the areas which could respond best, and note any complementary agronomic actions which may be necessary.

Appendix 2Terms of Reference

2. Object: To prepare a discussion paper to be entitled "Design options, labour requirements and costs of water harvesting in the ASAL areas". (The paper would draw upon climatic, soils and crop water requirement data generated by the agronomist).

Qualifications: Degree in agriculture or rural engineering with at least 7 years' hands-on experience with designing and evaluation water harvesting structures in various circumstances. Knowledge of both spate and run-off systems is necessary.

Terms of Reference: Following a brief review of literature on the subject, the engineer would review in detail the structures which have been used in Kenya quantifying costs of construction and maintenance requirements. He/she would examine the extent to which alternative, and/or cost-effective, designs and methods of construction could have been used. On the basis of the above, suitable design will be recommended for various local soil and climatic conditions which would permit existing crops to be grown with increased security. Capital costs, recurrent costs and the increased security which is afforded will be quantified.

Appendix 2OFF-FARM INCOME-GENERATING ACTIVITIESTerms of Reference

Object: To prepare a paper on support for off-farm income-generating activities which would be discussed at the workshop on the ASAL programme.

Qualifications: A degree in economics or social science with 7 years of experience, including design, appraisal and back-up of income-generating projects.

Terms of Reference: The expert will prepare case studies: (a) the existing non-farm activities undertaken by low and middle income households in ASAL areas (production costs and returns, market prospects, constraints, need for assistance) and (b) the economic viability and sustainability of income-generating projects implemented by MCSS, RDF, MLD and NGO's. The point would be to answer the following questions: which of the existing non-farm activities undertaken by the target group are worth supporting? Are the activities promoted by the line ministries and NGO's the right ones? Which are more profitable: the existing non-farm activities or the activities promoted by the line ministries and NGO's?

1. Existing Non-Farm Activities

Start with the activities listed in Matrix 1. For each activity, go to an ASAL area, identify a small sample of people involved in the activity and interview them. Using information from the interviews:

- identify sources (and costs) of materials, and describe methods of production (including labour inputs and their seasonality);
- prepare a cash flow for a small-scale enterprise (based on actual production costs, overheads, and returns to labour);
- identify who markets the projects, in what quantity, in what place, and who buys them, at what price, for each stage of the marketing chain; assess market prospects;
- list constraints to expansion of the activity, as perceived by the direct producers;
- assess the demand for assistance (on the part of the people involved in the activity) and the effective need for outside support.

## 2. Income-generating Projects

In collaboration with the Women's Bureau, the Rural Development Fund, the Ministry of Livestock Development and the Kenya Rural Enterprise Programme, identify a small sample of income-generating projects in ASAL districts. Go to visit these projects and interview the beneficiaries. All should be far enough along in their implementation that production costs and returns can be assessed.

- describe the method of production including labour inputs and procurement of raw materials (as above);
- describe marketing (as above);
- prepare a cash flow for the enterprise (based on actual costs, labour inputs and sales of products, do not prepare a theoretical model based on hypothetical "expected" costs and returns);
- list constraints as perceived by the direct producers.

## 3. Analysis

Prepare a summary table which compares the costs and returns to activities listed in sections 1 and 2 above.

Appendix 2KENYAARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENTBudget for Follow-Up Activities

		US\$	Man/ Months
		-----	
Local Consultant, Organizer	Stipend, per diem & local travel	10,000	3
Government Staff	per diem and local travel	10,000	30
Government Secretarial Assistance	Overtime, stationary & photocopying	2,000	
IC/IFAD Support Costs	Stipend, per diem int'l & local travel	60,000	6
Miscellaneous. 10%	hire of premises for workshop and workshop expenses.	8,000	
Total		----- 90,000	



KENYA

ARID AND SEMI-ARID LANDS DEVELOPMENT

KENYA'S ASAL DEVELOPMENT PROGRAMME

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TABLE

1. ASAL Project Budgets: Resource Allocation by Component

APPENDIX

1. Terms of Reference

KENYAARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENTACRONYMS

AIE	= Authorization to Incur Expenditure
BPSAAP	= Baringo Pilot Semi-Arid Areas Project
CADRW	= Community Action for Disadvantaged Rural Women
DANIDA	= Danish International Development Authority
SNL	= Dutch Volunteer Development Programme
EMI	= Embu/Meru/Isiolo
EEC	= European Economic Community
FAO	= Food and Agricultural Organization
FFW	= Food for Work
FB	= Forestry Bureau
GTZ	= German Technical Cooperation
IPAL	= Integrated Project for Arid Lands
IGAD	= Inter-Governmental Agency for Desertification
IFAD	= International Fund for Agricultural Development
ILO	= International Labour Organization
KIE	= Kenya Industrial Estates
KVDA	= Kerio Valley Development Authority
MIDP	= Machakos Integrated Development Project
MOA	= Min. of Agriculture
MALD	= Former Min. of Agriculture and Livestock Development
MCSS	= Min. of Culture and Social Services
MEST	= Min. of Education, Science and Technology
MERD	= Min. of Energy and Regional Development
MENR	= Min. of Environment and Natural Resources
MOF	= Min. of Finance
MOH	= Min. of Health
MLS	= Min. of Land Settlement
MLD	= Min. of Livestock Development
MPND	= Min. of Planning and National Development
MTW	= Min. of Tourism and Wildlife
MTC	= Min. of Transport and Communications
MOWD	= Min. of Water Development
NGO	= Non-Governmental Organizations
NORAD	= Norwegian Agency for Development
OP	= Office of the President
ODA	= Overseas Development Authority
TA	= Technical Assistance
T&V	= Training and Visit
TRP	= Turkana Rehabilitation Project
RDF	= Rural Development Fund
SIDA	= Swedish International Development Authority
USAID	= U.S. Agency for International Development
WB	= World Bank
WFP	= World Food Programme

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

KENYA'S ASAL DEVELOPMENT PROGRAMME

A. Early ASAL Initiatives and Policies

Economic and Development Setting

1. Kenya came into the seventies with a buoyant economy, considerable international attention and in terms of development, high expectations. Until that time, development had focused primarily on the high potential areas and it was not until the mid-70s that attention began to be paid to the arid and semi-arid lands (ASAL) which occupy about 80% of the country. This interest coincided with an increased awareness on the part of donors of the necessity of orienting development aid more to the poorest people in third world countries. Kenya's Fourth Development Plan (1979-83) reflected this trend and had as its theme, "poverty alleviation". Not only did the plan focus on poverty alleviation but it gave particular emphasis to the poor target groups in the ASAL areas - the pastoralists and subsistence farmers - and to development programmes directed towards assisting them. This orientation was further supported by growing international concern over the plight of dryland areas as evidenced by the establishment of research centres such as the International Centre for Agricultural Research in Dryland Agriculture and the International Crops Research Institute for the Semi-Arid Tropics. The United Nations Conference on Desertification in 1977 in Nairobi was the final stimulus that helped to create the country's ASAL Development Programme. Two documents were instrumental in defining the Programme and determining its direction over the years. The first was a comprehensive study funded by USAID of Kenya's marginal lands which was published in 1978. This was followed by an official Kenyan government policy paper 1/ which laid out the planning procedures, programme organization and broadly speaking, the strategy for ASAL development.

Base ASAL Document and the ASAL Development Team

2. This 1979 document was the key document to give orientation to the ASAL Development Programme and in fact to date has not been superseded nor updated. The aim of the Programme was seen as being to "improve the welfare of the inhabitants by the development of the productive potential of the areas, creation of income earning opportunities and provision of basic needs." This was in turn converted into four objectives:

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1/ Government of Kenya, Arid and Semi-Arid Lands Development in Kenya - The Framework for Implementation, Programme Planning and Evaluation, May 1979, Nairobi.

- a) Development of Human Resources.
- b) Exploitation of Productive Potential.
- c) Resource Conservation.
- d) Integration with the National Economy.

3. Institutionally, it set up a number of coordinating committees: an Interministerial Committee of Permanent Secretaries to meet twice a year, a Programme Coordination Committee, as a secretariat to the above committee, to meet every two months with the then Ministry of Economic Planning and Development having the key responsibility, and a Core Technical Committee, to meet as and when necessary, with a main orientation to agriculture and water development. The ministries involved in the Programme were:

- Office of the President
- Ministry of Finance
- Ministry of Economic Planning and Community Affairs
- Ministry of Agriculture
- Ministry of Water Development
- Ministry of Natural Resources
- Ministry of Lands and Settlement
- Ministry of Works
- Ministry of Cooperative Development
- Ministry of Health
- Ministry of Tourism and Wildlife
- Ministry of Housing and Social Services

Each was to create an ASAL unit within its ministry. As might be expected Agriculture took the technical lead and planning the lead in coordination.

4. In practical terms, the interdisciplinary ASAL Development Team established by the Ministry of Agriculture and heavily supported financially by USAID was the main driving force behind the ASAL Programme. Its main activities were focused on coordination of ASAL development, building-up a data base and carrying out studies. While in theory it had the full support of government policy behind it and the correct strategy orientation, it was largely a passive operation creating a base for ASAL development rather than initiating the development itself. This was primarily because it did not have the financial means under its control to launch projects or foster implementation. As a result, when USAID funding terminated in 1983, the ASAL Development Team while not disbanded essentially became moribund and is no longer concerned exclusively with ASAL.

5. The only body at the national level that currently focuses exclusively on ASAL Problems and the planning of ASAL Initiatives is the 3-man ASAL Unit in the Ministry of Planning and National Development. It has limited resources but actively works to help coordinate initiatives aimed at ASAL areas and to pull together information from ongoing and planned projects. But the task is well beyond its existing resources.

6. The combination of a high level of separate and geographically specific attention to the ASAL areas by the donors with relative institutional neglect by the ministries on the broader policy and planning front has resulted in the current situation of a lack of continuity in development and the inability to capitalize on the progress made in the ASAL projects. This is now being recognized by both Government and the donors. In

fact, in late 1985/early 1986, meetings were held between the donor coordination committee and the Ministry of Agriculture and Livestock Development and it was agreed that after research, ASAL development should receive the highest priority. In response, a number of position papers were produced summarizing development in the ASAL areas over the past eight to ten years, drawing conclusions and making certain strategy recommendations. It was within the framework of this renewed interest that the current mission was asked to look into ASAL development.

7. The following section attempts to draw some conclusions from the projects currently under implementation by use of matrix analysis. It is followed by a presentation of the issues that arise from these analyses.

## B. Review and Analysis of Donor Supported Projects

### Overview of ASAL Projects

8. The ongoing and planned ASAL projects (as defined by GOK and donors) are listed below. Matrix 1 provides further details: project title, district, donor, starting year, expected year of termination, type of funding (grant/loan), 1985-86 budget, total budget and future prospects.

- Machakos Integrated Development Project
- Kitui Arid and Semi-Arid Lands Project
- Baringo Pilot Arid and Semi-Arid Areas Project
- Embu/Meru/Isiolo ASAL Programme
- Turkana ASAL Programme
- Elgeyo/Marakwet ASAL Programme
- West Pokot ASAL Programme
- Ndeiya/Karai ASAL Project
- Laikipia Rural Development Programme
- Taita/Taveta District Development Programme
- Wamba ASAL Project
- Community Action for Disadvantaged Rural Women in ASAL Areas
- Kajiado ASAL Programme (pipeline)

9. The existing donor support to ASAL projects is substantial. Eleven donors are supporting 12 ASAL projects covering parts of 15 districts. The older projects have been ongoing for 7 years; some have entered a second phase; many are scheduled to terminate within the next two years. With one exception, all projects are funded on a grant basis; their combined budget for 1985/86 was over US\$7.5 million. All but one are area development projects.

10. The geographic distribution of donor-supported ASAL projects is as follows:

Agro-Ecological Category (GOK)	Districts covered by ASAL Projects	Districts not Covered
"A" (100% zones V and VI)	Turkana	Marsabit, Mandera, Wajir, Garissa, Isiolo
"B" (85% zones IV and V)	Kitui, Taita, Samburu, Kajiado	Tana River
"C" (over 50% in zones IV and V)	Machakos, Embu, Meru, Baringo, Laikipia, W. Pokot	Kwale*, Kilifi*
"D1" (under 50% in zone IV)	Elgeyo/Marakwet	Narok, Lamu, Nakuru
"D2" (only a tiny area in zone IV)	Kiambu (Ndeiya/Karai)	Kirinyaga, Nyeri

11. The geographic distribution of donor-supported ASAL projects overlaps only partially with the priorities outlined in the 1979 GOK ASAL planning document. With the exception of Turkana District, donors have not addressed the Category A districts. The Category C projects were the first to be taken up by donors (Machakos, Baringo, Embu, Meru, West Pokot) together with Kitui in (Category B). The concern with other Category B districts is recent. The IFAD Kwale/Kilifi project has been omitted from the list because intervention focusses on the well-watered coastal strip as opposed to the arid hinterlands.

12. Comparison of the list of ASAL projects received from the Ministry of Planning and the list furnished by the Ministry of Agriculture reveals lack of agreement about what constitutes an "ASAL" project. The Ministry of Planning lists all of the donor-supported, multi-sectoral area-development projects which they coordinate, several of which are not on the MOA list, by omits multisectoral projects coordinated by the Ministry of Agriculture (Wamba, Mutomo).

13. In general, ASAL projects are heavily concentrated in districts with a substantial portion of their area on ecozone IV, the marginal maize-based mixed farming zone. Districts having most of their land in zones V and VI are less appealing to donors because of their relative inaccessibility, the low population density, the relative lack of political priority accorded them by Kenyan planners, security problems and the current lack of technical packages ready for widespread diffusion. There appears to be need for the GOK to rank priorities for future donor initiatives among ASAL districts.

14. In addition to the ASAL projects listed above, donors are supporting a number of development projects which, although they are located in ASAL districts, for one reason or another, do not fall under the ASAL umbrella. These are listed below and details are given in Matrix 1a.

Kwale/Kilifi Development Project  
 Turkana Rehabilitation Project  
 Support to Settlement in ASAL Districts (Baringo, Samburu, Isiolo, Wajir, Tana River)  
 Mutomo Rural Development Project (South Kitui)

Integrated Project for Arid Lands (Marsabit)  
Garissa Irrigation Rehabilitation Project  
Magarini Settlement Project (Kilifi District)  
Weiwei Irrigation Rehabilitation Project (W. Pokot)  
Merti Irrigation Rehabilitation Project (Isiolo)

15. In many ways, these projects share similar objectives and activities with ASAL Projects. They focus on small-scale irrigation, dryland farming, water supply, afforestation and (to a lesser extent) livestock. A future task should be to clarify what is an ASAL project and whether the projects formulated outside the ASAL umbrella should be brought inside it.

#### Objectives and Strategies

16. In formulating their projects, donors initially put the accent on developing a set of improved practices for conservation of the economic base. Hence the Machakos project emphasized planning, soil and water conservation, and to a lesser extent afforestation; the Kitui project emphasized resource inventories, land use planning, pilot soil conservation and development of improved tillage methods. The Baringo project emphasized studies of the traditional systems of production, resource inventories, agricultural research and pilot soil conservation activities. The EMI project emphasized pilot soil conservation, afforestation and establishment of a goat breeding farm. In the absence of proven technical packages, exploitation of the area's productive potential was given lower priority. Development of human resources through support to health, education and community/social services was given particular emphasis in remote districts (Turkana, Baringo, Isiolo) which had inadequate services. Integration in the national economy was hardly addressed.

17. Intervention in ASAL areas during the Fourth Fifth Year Plan (1979-83) was based on the assumption that development would proceed in stages. Since USAID had taken leadership in the Pre-Investment Study, the Kitui project continued to support data collection, analysis and institution building at the central level with only pilot activities at district level. Donor projects in Machakos, Baringo, Meru and Embu emphasized pilot conservation activities and development of technical packages which could be extended to farmers at a later stage. The volume of pilot activities was predicated on the assumption that much greater resources would be available to support widespread district level activity in a second or third phase. The availability of economic resources for this development was never questioned.

18. 1983 marks a turning point in the ASAL programme. Imposition of ceilings on the GOK development budget, in response to mounting economic and financial difficulties, led to a gradual realisation that the volume of resources which would be available for future phases of ASAL development would be considerably less than initially anticipated. Given this state of affairs, GOK grew impatient with the heavy emphasis on research and central level institution building and the slow pace of achievements on the ground. As a result, the research and central level-institution building components of the USAID project was phased out, and several projects were reoriented to speed up implementation at district and grassroots level.

19. Concomitant with the reorientation of ASAL Projects, efforts to increase crop and livestock production were given a much stronger emphasis. This is wholly in line with the programme's overall objective of improving the social and economic well-being of people in ASAL areas by raising incomes and generating employment opportunities. The share of resources



allocated for health, education and community services decreased and some projects phased them out entirely (Baringo, Embu/Meru/Isiolo). This reorientation in the objectives and strategies of ASAL Projects has taken place informally. There has not been a new GOK ASAL policy document since 1979 and the implications of the economic crisis for ASAL have yet to be set forth on paper in a systematic way.

#### Activities Supported

20. The activities supported by ASAL projects are indicated in Matrix 2. The activities of non-ASAL projects in the same districts are listed in Matrix 2a. Core ASAL activities (those found in the majority of ASAL Projects) are:

- water development and conservation (for humans, livestock, and where possible crops)
- soil and moisture conservation
- livestock and range development
- adaptive research (drought-resistant varieties, water harvesting, minimum tillage)
- afforestation

21. Another directly-productive activity which is receiving support from a number of projects is non-farm income-generating activities.

22. In addition, many projects have support components whose purpose is to strengthen institutional capacity for implementing the core components at district level (planning support components) and at grassroots level (community organization and mobilization). One donor continues to support formal cooperatives; another donor has phased them out due to disillusionment with results. Land adjudication, which was initially considered indispensable for proper land use, receives limited support from one donor.

23. Components focussed on development of social infrastructure (health, basic education, youth polytechnics, adult education) were prevalent in the earliest ASAL Projects; although they are still quite widespread, their importance is diminishing.

24. The relative importance of the various components is illustrated by a breakdown of the Machakos project budget for 86/87: water development (60%), agricultural extension (10%), cooperative development (9%), soil conservation (7%), livestock (5%), agronomy (3%), forestry (3%), community organization (3%), rural industry (2.5%), adult education (2%). Other project budgets are illustrated in the appendix.

25. The shift in favour of activities concerned with production relative to social infrastructure has been informal and gradual. Although it happens to coincide with a reorientation of the broader policy environment at national level (see Sessional Paper No. 1), there has been no explicit change in ASAL policy or priorities since the original document was issued in 1979.

### Ministries Involved

26. The ASAL programme was initially intended as a multisectoral programme involving a number of ministries. An interministerial committee at national level was to have ensured coordination. In line with this policy, some of the earlier ASAL Projects called for establishment of an interministerial project coordinating committee at national level. In actual practice, such interministerial committees have rarely met. In recent years, some of the donors have grown disillusioned with multisectoral programmes due to problems of interministerial coordination. This has led some of them to favour single sector programmes which require only one ministry for their implementation, but this shift in orientation has never been endorsed by the majority of donors or GOK.

27. Matrix 3 gives a detailed breakdown of the ministries involved in each of the ASAL projects (Matrix 3a gives a corresponding breakdown for other projects in ASAL districts). There is only one ASAL project which is implemented by a single ministry (the GTZ project in Wamba); all the rest involve two or more ministries. In total, 12 ministries are involved with implementing existing ASAL projects.

28. The core technical ministries, which are involved in nearly all ASAL projects can be identified as:

- Ministry of Agriculture
- Ministry of Livestock
- Ministry of Water Development
- Ministry of Environment and Natural Resources (forestry)

29. The main support ministries are (a) the Ministry of Planning and National Development (coordination) and (b) the Ministry of Culture and Social Services (community organization and group mobilisation).

30. Ministries (or parastatals) whose support is complementary, but largely peripheral to, the core technical ministries include: Cooperative Development, Energy and Regional Development, Health, Education/Science and Technology, Tourism and Wildlife, Land Settlement, Survey of Kenya, and Kenya Industrial Estates.

31. Matrix 4 approaches the same subject from a different point of view. For each of the core activities which make up the ASAL programme, implementing ministries are listed. In four cases, two or more ministries cover the same technical field.

32. Water development - In the majority of ASAL Projects, water development (domestic and livestock) is entrusted to the Ministry of Water Development (MOWD). However, in several cases, the small-scale development of point sources is also undertaken by the Ministry of Agriculture in close connection with soil and moisture conservation activities. One non-ASAL project designed by IFAD for Siaya District entrusts all water development to the Ministry of Health.

33. Although on the surface it might seem a waste of resources to have more than one ministry involved in water development, on the basis of existing experience a strong case can be made for continuing to support the development of small point sources by MOA along side of the development of larger sources by MOWD.

- MOWD specializes in boreholes, piped systems, spring development, large dams, rock catchments and wells.
- MOA specializes in mobilising self-help for rehabilitation and construction of small point sources such as sand weirs, subsurface dams, pans, wing walls for mini-rock catchments and small earth dams, and in linking catchment conservation with water points.
- MOWD specializes in shallow wells and user training in proper hygiene and sanitation.

34. MOWD absorbs by far the largest share of funding for water development (66% of the budget of the Kitui project in 1986-87 and 60% of the budget of the Machakos project in the same year). Nonetheless, district level implementation capacity of MOWD continues to be a major bottleneck. MOA has been far more successful in mobilising local resources in the construction, operation and maintenance of water sources. Although MOWD's cost per litre is lower, the cost-per-beneficiary of MOA water development compares well with that of MOWD and in addition benefits appear self-sustaining (Interim Evaluation Report, Kitui ASAL project).

35. Irrigation - A few ASAL projects include irrigation rehabilitation components assisted by the MOA Irrigation and Drainage Branch or the Regional Development Authorities. However, most small-scale irrigation projects in ASAL areas fall outside the ASAL Programme (Garissa, Weiwei, Merti). The Magarini project is implemented by the Ministry of Land Settlement. None of the ASAL projects are assisted by the National Irrigation Board (which is concerned with large-scale government schemes) or the MOWD irrigation unit.

36. Afforestation - Most ASAL projects work with the Forestry Department (MENR), but a few work with MOA (fruit and fodder trees, on farm tree planting) or the Regional Development Authorities.

37. Non-farm activities - Several projects promote income-generating activities for women through the Women's Bureau located in the Ministry of Culture and Social Services. Others support vocational training through MCSS's Youth Polytechnics. The Machakos project provides clusters of workshop facilities for artisans through the Kenya Industrial Estates.

38. Community Organization - In Machakos and Kitui, MCSS community development staff have been utilized in a catalytic role to mobilise self-help groups for soil conservation, water development, distribution of planting material, testing ox-drawn implements, rehabilitation of cattle dips and beekeeping. Most other projects which include MCSS focus on infrastructure development (Youth Polytechnics, community centres), overlooking community organization.

#### Geographic Scope, Focus of Planning/Coordination and Coordinating Mechanism

39. Since 1983, the main administrative unit for rural development has been the district. Above the district level are the provinces; below the district level, the administrative units consist of divisions, locations and sub-locations. Matrix 5 indicates the geographic scope and the focus of planning and coordination for each ASAL project (Matrix 5a does the same for other projects in ASAL districts). The majority of ASAL Projects cover a single district and are coordinated at district level. Several projects

cover one division of a district. One project (Ndeiya/Karai) covers two locations in Kiambu District. Another (Embu/Meru/Isiolo) covers three districts of Eastern Province, and is coordinated at provincial level. In addition, one project was designed as an umbrella programme for 17 districts. None of the other projects have the district as their administrative unit. This appears to be a feature which distinguishes ASAL from non-ASAL projects.

40. In recent years, the trend has been toward standardisation of ASAL project scope and coordination at the district level. In the light of existing experience, this trend is to be encouraged. In general, projects whose geographic scope and focus of coordination are at district level encounter fewer administrative difficulties than projects which cover more than one district or only one division in a district. The Baringo project, which covers a single division, was based in Marigat, while the budget and workplans of GOK counterparts were controlled by district officers in Kabarnet. The project had considerable difficulty getting agreed GOK contributions into the district forward budget and getting counterparts released for project duties.

41. The Embu/Meru/Isiolo project, which was formulated before district focus, launched activities such as soil conservation, afforestation and goat multiplication meant to cut across the ASAL areas of two districts. When the two programmes were run jointly, one expatriate expert could backstop activities in both districts; now that each district's programmes are run separately, one expert per component would be needed for Embu and one for Meru.

42. ASAL projects in transitional (i.e. partly medium potential) districts face another issue: the feasibility, and desirability, of restricting project support to ecozones IV-VI. In Kitui, which has over 85% of its land in ASAL ecozones, the project makes no attempt to exclude the medium-potential areas, but tailors its technical packages to zones IV and V. In Machakos, Embu and Meru, the project area officially covers only the arid and semi-arid zones. In actual practice, the forestry component in Embu and Meru operates mainly in the high and medium potential areas as does the water development component in Machakos.

43. The Dutch projects in W. Pokot and Elgeyo/Marakwet adopt a different formula: budgetary support to the line ministries covers the entire district; infrastructure projects, on the other hand, are limited to ASAL areas. Likewise, the EEC project in Machakos finances operating expenses for MOWD in the whole district but limits agricultural extension (T&V) to the ASAL areas.

44. When the ASAL areas of a district cover less than one division, projects lose their administrative viability. The lesson learned from the Ndeiya/Karai project is that it is practically impossible to work through the DDC to get funds allocated to disadvantaged locations within a better-off district. Because the project's geographic scope is so small, the ASAL formula is not viable and the project will probably be phased out.

45. Most of the ASAL projects, with the exception of Wamba and Embu/Meru/Isiolo, are coordinated by the Ministry of Planning. In general, experience shows that projects coordinated by the Ministry of Planning at national level have experienced fewer difficulties with interministerial coordination than those coordinated by the Ministry of Agriculture. Many of the Baringo project's difficulties were resolved when coordination was transferred to the Ministry of Planning. None of the non-ASAL projects are coordinated by the Ministry of Planning.

46. Likewise, projects coordinated at district level by the District Planning Officer (MPND) or the District Development Officer (DDO) experience have less difficulty enlisting interministerial collaboration. The SIDA women-in-development project, although coordinated by the Ministry of Planning at national level, was unable to call upon MOA extension staff to backstop income-generating projects because the District Social Development Officer (Ministry of Culture and Social Services) had no mandate to call upon staff of other ministries for assistance.

#### Integration in District Focus

47. The GOK's District Focus Policy (Annex 4) was designed to strengthen local initiative in the identification, selection and planning of development activities. Before District Focus, the range of project activities was determined from the top down, by a project design team reflecting the views of donors and ministry staff in Nairobi. In the future, project activities should be identified by a bottom-up process, which starts with the Locational Development Committee and sends proposals upwards through the Divisional Development Committee to the District Development Committee for approval.

48. By now, nearly all ASAL Projects channel proposed work plans to the District Development Committee for approval. The only activities which are not sent to the DDC are those considered too small and unimportant to warrant the DDC's time and energy (minor self-help soil and water conservation, income-generating activities). But this does not imply that project activities are actually identified by the direct beneficiaries through a bottom-up process.

49. At the one extreme, project activities can be entirely identified by the donor and merely ratified by the DDC; at the other extreme, project activities can be entirely identified by District Authorities. The Embu/Meru/Isiolo project (ODA) and the Turkana project (NORAD) have programmes which are mainly donor-identified, while the Dutch projects in W. Pokot and Elgeyo/Marakwet implement activities which are mainly DDC-initiated. Baringo and Kitui tend toward the donor-identified model; Laikipia tends toward the DDC-identified model; while Machakos and Taita/Taveta are in the middle.

Advantages of DDC Initiated Activities	Disadvantages of DDC Initiated Activities
Fits GOK Policy	Bias to areas with highest population density (non-ASAL)
Bottom-up	Infrastructure bias
Responsive to local priorities	Line ministries propose inappropriate actions
	Shopping lists
	Stereotyped list of choices
	People's actual involvement minimal
	Donor programme lacks cohesion

50. DDC-initiated activities, while nominally more responsive to local priorities, are heavily biased in favour of infrastructure such as schools, clinics, village polytechnics, roads, boreholes, and dams. Even activities classified as "directly productive" are mainly construction (cattle dips,

crushes and market places). Many of the core activities of ASAL Projects (agronomic trials, bulking, goat multiplication, resource surveys, sociological studies, farmer training and extension), which do not involve construction run the risk of being left out. There is a need for a mechanism which can ensure proper balance between infrastructure, services and development of technical packages.

51. The preferences expressed by locational, divisional and district authorities are shaped by a predetermined, largely stereotyped list of options. The Dutch lament that DDC's tend to think in terms of clinics, schools, and boreholes rather than productive projects. The Swedes, on the other hand, lament that when officers from the Ministry of Culture and Social Services asked women's groups to list their needs, they identified a stereotyped list of income-generating projects such as goat raising, beekeeping and handicrafts, overlooking higher priority needs such as water supply, irrigation and schools. Action is urgently needed to raise consciousness of options which go beyond existing stereotypes. Demonstration of alternative possibilities appears a prerequisite before people can choose them.

52. A related issue regards the appropriateness of technical solutions currently promoted by the DDC's. For example, cattle dips which require a lot of water may not be the best solution for arid areas. A mechanism is needed within the ASAL programme which ensures that technologies fit the local climate and socio-cultural conditions.

#### Mode of channeling project funds

53. Matrix 6 indicates, for each ASAL project, the share of total project cost which GOK is expected to bear, and the mode of channeling project funds. At the time when the first ASAL projects were designed, it was customary for donors to expect that a substantial share of project costs (mainly local salaries, office facilities, operating costs) would be borne by government. Thus in Kitui, 60% of project costs were to be borne by USAID, 30% by GOK, and 10% by the direct beneficiaries. In Baringo, 75% was to be borne by the World Bank (IDA) and 25% by GOK.

54. In the Baringo case, the IDA contribution was a loan to GOK, and therefore the entire budget was to be channeled through government. In the Kitui case, part of the funds were channeled through government and part through a contracting firm engaged to implement the project. In both cases, the volume and timeliness of the release of project funds to the line ministries at district level was so inadequate that implementation suffered greatly. Infrastructure projects were hampered by lack of funds for construction materials and transport. Agronomic trials had to be abandoned in mid-season due to lack of funds to cover hired labour.

55. Because of the difficulty of obtaining the agreed level of line ministry funding at the appropriate time, overall disbursement has lagged. Between 1979 and 1986, the Baringo project disbursed approximately US\$2 million out of a total of US\$8 million. During the same period, the Kitui project disbursed less than half of its US\$11 million budget. Because of slow disbursement, project termination dates have been extended in Machakos, Kitui, Baringo, Embu/Meru/Isiolo, and Turkana.

56. One unintended consequence of the bottleneck in release of project funds at district level was that expatriate experts were drawing their salaries but little development activity was taking place on the ground. Due to circumstances beyond the project's control, during the early years, a disproportionate share of the funds actually disbursed by projects went for

expatriate salaries (approximately 40% of the total in Kitui before 1983 and 33% of the total in Baringo).

57. To get around the funding bottleneck, most donors have resorted to financing up to 100% of the GOK contribution up front through direct payment. The Machakos project was the first to establish an imprest account intended to pre-finance the GOK contribution; other projects have followed the example. The exception is the World Bank project in Baringo, which, because it is a multilateral loan to government rather than a bilateral grant, is compelled to channel 100% of its funds through the AIE system. IFAD funds would have to be channeled the same way.

58. The advantage of direct payment is that the pace of project implementation is not hampered by delays in release of funds through the line ministries. It is to the district's advantage, because more development takes place on the ground. Quick disbursement and rapid achievement of appraisal targets is also to the donor's advantage. The disadvantages of direct payment are (a) that donor project funds elude budget ceilings and government control and (b) that government channels are not strengthened. Neither government or donors are happy with the situation. However, in practice the direct payment system is tolerated because both government and donor have a vested interest in accelerated development at district level.

#### Technical assistance

59. Partly as a result of the situation described above, technical assistance has become controversial in Kenya. In recent years donors have been advised to reduce the number of expatriate staff funded under ASAL projects. Matrix 7 lists, for each ASAL project, the number of expatriate project staff and their area of technical specialization.

60. The largest concentration of expatriate technical assistance is in the role of advisor to the national coordinator. All projects except Machakos have an expatriate in this role, who assists with coordination and authorizes direct payments through the project account. In three cases (W. Pokot, Elgeyo/Markwet, Ndeiya/Karai), the advisor to project management is the only expatriate. All implementation under these projects relies on existing line staff at district level.

61. The second largest concentration of expatriate technical assistance is in water development, where engineering design capacity is perceived as a critical bottleneck. Other areas where technical assistance is being provided (in descending order of importance) are: agronomy, soil conservation, forestry and livestock. One or two projects have provided expatriate staff to assist with ASAL Planning, education, health, social services or fisheries. The Dutch projects have the smallest number of expatriate advisors (one per project). The NORAD project in Turkana and the ODA project in Embu/Meru/Isiolo have the largest.

62. Although donors and government agree that expatriate experts should serve in a technical advisory/training capacity, in practice they have often been forced to assume executive functions in order to achieve appraisal targets. Use of technical assistance for direct execution of projects is most common for water development. Experience in Machakos and Kitui suggests that the pace of implementation of water projects at district level is directly related to the expatriate engineering input. Before the EEC came in, MOWD has approximately 20 water projects ongoing in Machakos; under MIDP, MOWD handles 100 projects at any given time. The former district water engineer reports that there was no way he could have handled that workload singlehandedly. In contrast, Dutch projects in West Pokot and

Elgeyo/Marakwet, which have not provided technical assistance, handle no more than 10 water projects at any time.

63. The advantage of using technical assistance for execution lies in the more rapid pace of implementation. The principal disadvantage is lack of continuity: when the expatriate input is withdrawn, the pace of implementation falls to pre-project levels. There is a clear trade-off: if expatriate technical assistance were to be eliminated, GOK would have to accept a lower pace of implementation.

64. Experience suggests that technical assistance has had greater multiplier effects (in terms of outputs and numbers of beneficiaries) in water development and soil conservation components in contrast with agronomy and livestock. The reason may lie in the absence of technical packages ready for widespread diffusion and the longer gestation period required before research results can be diffused. In spite of limited results to date, premature elimination of TA from these components could have the unintended effect of minimizing rather than maximizing the eventual benefits to farmers. There is considerable scope for increasing the multiplier effects of existing technical assistance.

#### Methods for dealing with implementation bottlenecks

65. Projects have dealt with bottlenecks in local implementation capacity in two opposite ways. The majority have bypassed the government system by financing up to 100% of line ministry contributions through direct payment, by utilizing expatriate advisors for direct execution of works, and by hiring Kenyan short-term contract staff outside of the line ministries. The net result has been an accelerated pace of implementation in the short run at the cost of long-run sustainability.

66. The main thrust of the Dutch projects, on the other hand, is to improve implementation capacity of existing line ministries without technical assistance or incremental staff. This is accomplished by providing external (direct) funding to increase existing staff presence in ASAL areas of the district (facilities, housing, transport, nights out allowances). Although the additional funding strengthens local implementation capacity in the short run, the gains are temporary rather than permanent.

#### Mobilisation of local resources

67. Matrix 8 compares how ASAL Projects have mobilised labour for project components: some have relied on paid labour, some on food-for-work and others primarily on self-help. Two projects have been highly successful in mobilising local resources in support of development. Indigenous mwethya groups (80% female) have built 8,000 km of fanya juu terraces in Machakos and 2,800 in Kitui. This has been achieved by providing limited technical advice and hand tools (shovels and jembes) to self-help groups registered with the Ministry of Culture and Social Services. Both projects provide funds to MCSS for assistance with community organization and mobilisation.

68. In Kitui, mwethya groups are contributing up to one third of the cash costs and 100% of the unskilled labour for construction of small water projects under MOA. Before the project will assist a group by providing technical guidance and cement, the group must form a water users association, stipulate an agreement for the maintenance and repair of the source, and complete conservation works around the source to reduce siltation. Following MOA's example, MOWD is increasingly utilising self-help labour for construction of water projects. Mwethya groups also provide most of the labour for chief's nurseries and afforestation under MENR. To a



lesser extent, self-help labour has been mobilised for range reseeding and rehabilitation of cattle dips. Self-help labour has greatly reduced to government's cost of providing and maintaining infrastructure (the total value of the self-help contribution in the Kitui project is estimated at US\$1.8 million).

69. The Laikipia project has adopted a similar strategy for all its components: self-help groups are expected to raise approximately 20% of the total value of infrastructure works up front through harambee labour as a condition for project support. In other ASAL projects, efforts to mobilise local resources through self-help are still in an embryonic state. Although indigenous forms of self-help are more prevalent in certain ethnic groups than others (see Annex 2 on the target group), there is still considerable scope for extending successful experiences to other ASAL projects.

70. The Baringo project has successfully mobilised self-help labour for rehabilitation of indigenous irrigation systems, but communities are reported to be unwilling to do soil conservation or afforestation without compensation. While it would be easy to attribute this to ethnic differences, extensive use of food-for-work has been a disincentive for self-help in Baringo as well as Turkana. Willingness to provide self-help labour also depends on whether the individual sees tangible benefits from doing so. In Kitui, women's labour contribution for water projects has a direct payoff in time savings; terracing has a direct payoff in increased moisture for crops. In Baringo, irrigation rehabilitation has tangible benefits to group members, but soil conservation and afforestation apparently do not.

71. Policy guidelines regarding food-for-work are urgently needed. One advantage of food-for-work is that vast amounts of labour can be mobilised for infrastructure works. Another is that it incorporates a self-selection mechanism (it is claimed that only people who are destitute would be willing to do the work). The disadvantages are that: (a) people are willing to build works of questionable value simply to get the food; (b) the works are not utilized; (c) the workers have a vested interest in their destruction and reconstruction (to get more food-for-work) rather than their maintenance; (d) dependency on food aid is widespread and (e) self-reliance and harambee spirit are undermined. WFP proposes to undertake a detailed study of food-for-work in the near future. GOK should consider linking the study to the proposed ASAL workshop.

#### Grassroots receiving mechanisms

72. Some ASAL projects deliver project services primarily to individuals; other deliver the majority of services to groups. One reason why projects in Machakos and Kitui have reached such a large number of beneficiaries is that most components utilise groups rather than individuals as a receiving mechanism. In Machakos, extension workers can reach many more farmers by contacting mwethya groups in comparison with individual contact farmers. By now, in Machakos, over half of extension contacts are with groups. In Kitui, 90% of project inputs and services are delivered to groups. In addition to soil conservation, water development, nurseries, and afforestation, self-help groups have been used for testing of improved ox-drawn implements, diffusion of drought-resistant plating material, agricultural extension, leadership training, and adult education; women's groups are utilized for beekeeping, and group ranches are utilized for livestock related activities. The Laikipia project and the SIDA women-in-development project also utilize existing women's groups as the main receiving mechanism for project inputs. The advantages of utilizing groups as a receiving mechanism include more efficient service delivery, with a lower overhead cost per person contacted, and higher sustainability.

### Project achievements

73. Matrix 10 compares achievements of ASAL projects in key sectors such as water development, soil conservation, afforestation, livestock, agronomy, and social infrastructure. In general, targets have been achieved and even exceeded in water development and soil conservation, while livestock and agronomy components have produced fewer tangible results to date. After years of implementation, some projects have not achieved widespread contact with local farmers and ranchers. While it would be tempting to conclude that there is a direct trade-off between working within GOK institutional structures and the level of accomplishments, the evidence shows that bypassing the system, in itself, is no guarantee of results. In general, projects in ecozones V and VI have lagged behind those in zone IV, probably due to the lack of technical packages ready for widespread uptake.

### Benefits and beneficiaries

74. With the exception of Kitui, which was covered by an interim evaluation, little data exists on project benefits and beneficiaries. There is an urgent need to fill this gap.

75. Beneficiaries - In Kitui, as of April 1985, the soil conservation component had provided 1000-1200 self-help groups (20-30 members each) with hand tools and assistance in terrace layout. The component had directly benefitted at least 20,000 households (26% of the population in the project area), and was expected to reach an additional 20-27,000 households before termination of Phase II in Nov. 1986. In addition, water projects (completed and under construction) would directly benefit 25,000 households (33% of the total population). In addition, the small livestock component had reached about a thousand households (including 250 women keeping bees). Interestingly, although it is not a "women's project", 70-80% of the direct beneficiaries of the Kitui project are women, due to the emphasis on water supply and the utilization of self-help groups as the principal receiving mechanism. In contrast, the US\$550,000 SIDA women's project reached only 691 beneficiaries over a three year period.

76. Benefits - The evaluation report estimates the cost-benefit ratio for soil conservation as 1:4; for water projects it ranges from 2.07-10.7. In most cases, the full investment cost is paid off within 2-3 years after benefits begin. This was achieved at a cost-per-beneficiary of US\$197 (based on 20,000 beneficiary households, which is a conservative estimate in the light of figures above).

### Self-sustainability of benefits

77. Preliminary findings from the Kitui evaluation suggest that benefits from soil conservation and water development are likely to be self-sustaining (at little or no cost to GOK). There appears to be a direct positive correlation between self-help mobilisation and sustainability. The direct beneficiaries (self-help groups) are maintaining fanya juu terraces to get additional moisture for crops; they are maintaining water points because the benefits of (more water, time savings) are tangible. Similar findings are reported for Machakos, (Matrix 11).

78. In Baringo, irrigation works (rehabilitation of traditional indigenous systems) are being utilized and maintained, but other works constructed for food-for-work (bunds, microcatchments for trees, afforestation) are not. The experience of the Turkana project, in

particular, suggests that there is a strong negative correlation between sustainability and food-for-work. Likewise, there is very little evidence to date, that the Turkana perceive tangible benefits from the trapezoidal and semicircular water harvesting structures built with food-for-work.

79. In short, infrastructures and activities which provide tangible benefits to local people are maintained; those which do not produce tangible benefits are not. People are willing to contribute self-help labour for works which benefit them directly: they are not willing to contribute self-help labour for works which provide no tangible benefits. The labour for constructing them can be mobilised by food-for-work, but unless food-for-work is also used to maintain them, they will not be maintained. In addition to motivation, simplicity of maintenance (local people's ability to do it on their own) is also important.

80. Another key to sustainability is training aimed at strengthening group's self reliance. Under the Kitui project, leaders of self-help groups are trained to lay out terraces on their own. This makes the groups less dependent on technical input from the extension service. At the same time, it reduces the demands on line ministry personnel, saves travel time and transport costs. Likewise, leaders of water users associations are trained to make simple repairs. This takes the burden of maintenance off GOK and reduces the demands on MOWD personnel. Leaders of beekeeping groups are trained to diagnose and solve minor problems, reducing the need for frequent visits by livestock officers. Training activities of this type simultaneously reduce bottlenecks in line ministry implementation capacity while improving sustainability. There is considerable scope for promoting their expansion.

### C. Issues and Points for Discussion

81. There are a number of broad points which need to be raised for discussion at the future workshop on the ASAL programme. In addition, there are several specific issues which need clarification from the line ministries.

#### Points for discussion

82.

- 1) To what extent is GOK prepared (and able) to absorb what has been initiated by existing area development projects under the ASAL programme?
- 2) The majority of category "A" ASAL districts are not covered by area development projects and donors appear reluctant to take on these areas: what priority do these districts have and how will their needs be addressed if donor support is not forthcoming?
- 3) In recent years, ASAL Projects have reduced the emphasis on social infrastructure relative to production: does GOK endorse this shift in emphasis?
- 4) If activities funded under ASAL projects are identified by local development committees, how can the bias to social infrastructure (as opposed to productive projects) be counter-balanced?

- 5) If donors are to be brought within the government system, how can this be made sufficiently palatable to them in the light of their need to produce tangible results at district level to justify their country's investment in ASAL?
- 6) If technical assistance is to be phased out, what can be done to ensure that the returns on existing TA are maximised?
- 7) How can the problem of line ministry implementation capacity at district and lower levels can best be resolved: working within the system or bypassing it, or a combination of both?
- 8) In the light of evidence that delivery of project inputs and services is more efficient and cost-effective when groups are used as a receiving mechanism, should all ASAL projects be encouraged to utilize this strategy?

#### Issues

83. The following points need clarification from GOK:
- 1) Clarify the respective roles of MOWD and MOA in ASAL water development.
  - 2) Clarify whether small-scale irrigation projects in ASAL districts (eg. Weiwei, Merti, Garissa) should be brought within the ASAL programme.
  - 3) Clarify the role of MCSS in organizing and mobilizing beneficiary groups for activities launched by MOA, MLD, and MOWD.
  - 4) In the light of experience, clarify whether the district should be the standard geographic unit for area development projects funded under ASAL.
  - 5) Clarify policy regarding the inclusion/exclusion of high and medium potential areas from ASAL projects in transitional districts.
  - 6) In the light of experience, clarify the role of MPND versus MOA in coordinating ASAL projects at national level and the role of the DDO in coordination at district level.
  - 7) Clarify whether even the smallest activities (soil conservation, income-generating projects) need to be channeled through the DDC for approval, even if this greatly increases the administrative burden and slows capacity to respond to local requests.
  - 8) Clarify whether the direct financing outside the government budgetary system will continue to be tolerated.
  - 9) Clarify policy regarding use of technical assistance in ASAL Projects, and if TA is to be phased out, whether lower levels of accomplishments are acceptable.
  - 10) Clarify policy regarding use of food-for-work in relation to ASAL projects.

- 11) Sustainability: policy guidelines are needed to assist line ministries and donors in promoting activities which can become self-sustaining and to avoid projects with high recurrent costs or which are not likely to be maintained.

Follow-up needed in preparation for the workshop on the ASAL programme

84. Information is urgently needed from all ASAL projects regarding achievements, numbers and types of beneficiaries, cost-benefit ratios, cost-per-beneficiary of different project components.

MATRICES ON ASAL PROJECTS AND OTHER PROJECTS IN ASAL DISTRICTS

Note: The information contained in the matrices is incomplete. In some cases it may be inaccurate. It was compiled from project documents and interviews with donors. The short duration of the mission's stay in Kenya (3 weeks) did not permit cross-checking in the field. Line ministries and donors are welcome to assist in completing, updating or correcting the information contained therein.

- Matrix 1 - Basic Data - ASAL Projects
  - 1a - " " " "
  - 1b - " " - Other Related Projects in ASAL Districts
  
- Matrix 2 - Activities supported - ASAL Projects
  - 2a - " " " "
  - 2b - " " - Other Projects in ASAL Districts
  - 2c - " " " " " "
  
- Matrix 3 - Ministries Involved - ASAL Projects
  - 3a - " " - Other Projects
  
- Matrix 4 - Core ASAL Activities: Ministries Involved
  
- Matrix 5 - ASAL Projects: Geographic Scope and Coordination
  - 5a - Other Projects in ASAL Areas: Geographic Scope and Coordination
  
- Matrix 6 - Mode of Channeling Funds (ASAL Projects)
- Matrix 7 - Technical Assistance: ASAL Projects
- Matrix 8 - Labour Source/Compensation for Project Works
- Matrix 9 - Grassroots Receiving Mechanisms for Project Inputs and Services
  
- Matrix 10 - Achievements of ASAL Projects - Water Development
  - 10a- " " " " - Other Components
  
- Matrix 11 - Self-Sustainability of Benefits by Activity, (ASAL Projects)
  
- Table 1 - ASAL Project Budgets: Resource Allocation by Component

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Basic Data - ASAL Projects

Project	District(s)	Donor	Starting date	Ending date	Grant/ Loan	1985-86 Budget (K. pounds)	Total Budget (US\$)*	Future Prospects
MIDP	Machakos	FEC	I. 1979 II. 1983	I. 1983 II. 1987	G	2,498,135	ECU:15,714,000 19,107,860	To be extended until 1988; Phase III planned
Kitui	Kitui	USAID	I. 1979 II. 1984	I. 1984 II. 31/10/86	G	1,464,076	11,000,000	To be extended until Nov. 87; Phase III uncertain
EMI	Fmbu, Meru Isiolo	ODA	I. 1982 II. 1986	- 1986 - 1989	G	696,620	I- II- 3,251,156	Expected to continue
Baringo	Baringo	World Bank	I. 1979	- April 1987	L	946,604	9,000,000	Phase II under Consideration
Turkana	Turkana	NORAD	1982	- 1987	G	1,035,980	8,695,000	Expected to continue at lower budget
W. Pokot	W. Pokot	NI	I. 1982 II. 1985	- 1985 - 1988	G	93,700	No info	To be continued
Elgeyo/ Marakwet	Elgeyo/ Marakwet	NI	I. 1982 II. 1985	- 1985 - 1988	G	30,870	No info	To be continued
Mdeya/ Kerai	Kiambu	NI	1985	- 1988	G	165,260	No info	Likely to be phased out
Laikipia	Laikipia	Swiss	1985	- 1986	G	156,000	926,667	To be renewed on a 2 year basis
Taita/ Taveta	Taita/ Taveta	DANIDA	1986	- 1988	G	not operational in 85-86	2,755,555	New proj. no plans yet
Kajiado	Kajiado	NI Volunteers (SNU)	I. 1987 II. 1989	- 1988 - 1994	G	not operational in 85-86	250,000- 500,000	Long term/open ended
Wamba	Samburu	GT7	I. 1981 II. 1986	- 1985 - 19 ?	G	no info	No info	
Cadw in ASAL Areas	To date: W. Pokot Isiolo Taita Kajiado	SIDA	1982	- 1985	G	terminated in 1985	550,000	UNDP funding sought for additional 3 years

\*Converted to US\$ at official U.N. Exchange Rates in Feb. 1987

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ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Basic Data - Projects classified as "ASAL" by GOK but not by donor

Project	District(s)	Donor	Starting date	Ending date	Grant/ Loan	1985-86 Budget (K. pounds)	Total Budget (US\$)	Future Prospects
Farmers groups and support Community	STAYA	IFAD (RSF)	1985	- 1990	1	59,452	3,790,000	
Kwale/ Kilifi Dev. Proj.	Kwale, Kilifi	IFAD	I. 1984 II. 1987	- 1987 - 1992	1	175,700	I- II- 4,100,000 (proposed)	Phase III under appraisal



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ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Basic Data - Other Donor Projects in ASAL Districts

Project	District(s)	Donor	Starting date	Ending date	Grant/ Loan	1985-86 Budget	Total Budget (US\$)	Future Prospects
IPAL Kenya Arid Lands Re-search station	Marsabit	UNFSCO GT7	No info	No info	G	No info	7,865,170	No info
W. Marsabit IRDP	W. Marsabit	GT7	Pipeline		G	No info	No info	Pipeline
Turkana Rehabilitation Project.	Turkana	EFC WFP	I. 79-83 --> 6/85 II. 7/1/85 - 3/1/88 WFP 1/1/84-12/88		G	EFC - 617,500	EFC-112,300 WFP-3,800,000 WFP	No info
Camel Disease & Productivity Project	Arid Lands	GT7	1987 -	1999	G	not in operation	1,292,135	Approved
Support to Settlement in ASAL Districts	Baringo, Wajir, Samburu, Isiolo, Tana River	WFP	1977-1982 1983-1988 (June)		G		5,000,000	
Magarini Settlement	Kilifi	Australia	I. 1976 - II. 1981 - III. 1985 -	1980 1984 1987	G	755,333	I&II 5,196,170 III 2,000,000	Last phase: to be handed over to GOK
Mutomo RD	Kitui	DANIDA	No info	No info	G		No info	Proposal to extend to entire district in Phase II
Garissa Irrigation Rehab. proj.	Garissa	DANIDA	No info	No info	G	No info	4,375,000	
Desert Crops	Arid Lands	GT7	Pipeline		G	-	No info	Not approved yet
Mandera Wajir Garissa	Mandera Wajir Garissa	IGAD *	Pipeline		No info	-	No info	Proposals being prepared
Weiwei Irrigation Rehab. proj.	W. Pokot	Italy	1986	No info	G	not in operation	9,286 million	
Herti Irrig. Rehab. proj.	Isiolo	Italy	1986	No info	G	not in operation	1,428 million	

\* International Government Agency for Drought & Desertification.

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ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Activities Supported by ASAL Projects

Activity	Machakos	Kitui	Emi	Baringso	Turkana	W. Pokot	Elgeyo/ Marakwet	Ndeya/ Karaj	Laikipia	Taita/ Taveta	Kajiado	Wamba	Cadw	Total proj.
Water Devel.	x	x		x	x	x	x	x	x	x	x			10
Irrigation				x	x	x	x					x		5
Water Harvesting		x		x										3
Soil Conservation	x	x	x	x					x	x	?	x		8
Adaptive research	x	x	Phase II	x					x	x	?	x		7
Bulking	x	x	Phase II	x						x	?			5
Improved tillage Implement		x												1
Forestry/Afforest.	x	x	x	x	x	x	x		x	x	x	x		11
Goats/Sheep Multiplication	x	x	x	x		x						x		6
Livestock marketing			Phase II	x	x		Construc.				x	x		6
Animal Health	Dips	Dips	Dips		x	Dips	Dips				Vaccin.	x		8
Range management/ Rehabilitation	x	x	Phase II	x			Reseed				x	x		7
Cattle/Dairy	x	x												2
Camels					x							x		2
Beekeeping	x	x	x				x		x		x		x	7
Fisheries					x				x					2



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ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Activities Supported (Other Projects in ASAL Districts)

Activity	IPAL	Kwale/ Killfi	Turkana Rehab. proj.	WFP Settlement	Magarini Settlement	Mutomo RD	Garissa Irrigation	Weiwei Irrigation	Merti Irrigation	Total Proj.
Water Devel.			I. x II. no		x	x				4
Irrigation		x	Spate	x	x		x	x	x	7
Water Harvesting			x							1
Soil Conservation			x			x				2
Adaptive research		x								1
Bulking		x								1
Improved tillage Implement		x								1
Forestry			x	x						2
Goats/Sheep Multiplication	x			x						1
Livestock marketing		x	x	x						2
Animal Health			Dips							1
Range management/ rehabilitation										0
Cattle/Dairy										0
Camels										0
Beekeeping		x								1
Fisheries		x								1
Roads			x		x					2

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## ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

## Activities Supported (Other Projects in ASAL Districts)

Activity	IPAL	Kwale/ Kilifi	Turkana Rehab. proj.	WFP Settlement	Magarini Settlement	Mutomo RD	Garissa Irrigation	Wejwei Irrigation	Merti Irrigation	Total Proj.
Rural Industry										0
Coop. Development		x			x					2
Income-generating Projects (Women)										0
Youth polytechnics										0
Community Development			x		x					2
Adult. Education										0
Basic Education										0
Health/nutrition			x		x					2
Planning		x								1
Soil/water Surveys	x								x	2
Sociological Studies	x				x					2
Land adjudication										0
Coop. Stores										0
Credit		x								1
Programme support			x							1
Drought Monitoring	x		x			x				2

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ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ASAL Projects (Ministries involved)

PROJECT	LEAD Ministry	MPND	MOA	MD	MOWD	MFNR	MCSS	MTC	MOH	WEST	MFRD	MLS	MCD	OTHER
Machakos IDP	MPND	x	x	x	x	x	x						x	KIF
Kitui ASAL	MPND	I. II.	x		x	x	x							
EMI	MALD	I. II.	x	x		x		x	x	x				NGO
Baringo BPSAAP	MOA --> MPND	I. x II.	x	x	x	x	x		x	x		x		
Turkana	MPND	x	x	x	x	x	x	x	x	x	x		x	
W. Pokot	MPND	x	x	x	x	x	x		x	x			x	
Elgeyo/Marakwet	MPND	x	x	x	x	x	x		x	x				
Ndeya/Karai	MPND	x	x	x	x					x				
Laikipia	MPND	x		Vet. Dept.	x	For. Dept.	x	x						Fisheries (MTW)
Taita/Taveta	MPND	x	x	x	x	x	x							
Kajiado	MPND	x	x	x	x		x	x	x					
Wamba	MALD		x	x		?								
Cadw	MPND	x					x							

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ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Other Projects in ASAL Districts (Ministries involved)

PROJECT	LEAD Ministry	MPND	MOA	MID	HOWD	MFNR	MCSS	HTC	MOH	MFST	NERD	MLS	MCD	OTHER
Ipai														
Kwale/ Killie	MPND	x	x	x						?			x	MTW (fish)
Turkana Rehab. proj.	KVDA (NERD)		x?	x?		x		x			x			NGO
WFP Settlement	MLS						?					x		NGO
Magarini Settlement	MLS												II.	
Mutomo RD	MOA/LD		x											
Garissa Irrig. rehab.	MOA		x											
Weiei Irrig. Rehab.	KVDA (NERD)													
Merti Irrig. Rehab.	NGO											x		NGO

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ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

CORF ASAL Activities : Ministries Involved

Activity	Institutions involved	Type of Intervention	Projects
<u>WATER SUPPLY</u>	MOWD	Dams, Rock catchments, Boreholes, springs, wells, piped systems	Machakos, Kitui, Baringo, W. Pokot, E/Marakwet, Turkana, Laikipia, Ndeya/Karai, Taita/Taveta (Kajiado)
	MOA (Soilcon)	Small point sources = rock catchments, subsurface dams, dams	Kitui, Mutomo, Machakos (?)
	MOH/UNICEF	Shallow wells, user training in hygienic use & maintenance	(Siaya)
<u>IRRIGATION</u>	HALD: IDR/PIU	Small scale (largely farmer-managed) irrigation schemes	Elgeyo/Marakwet, W. Pokot, Danida
	MOWD	Feasibility studies/T.A.	(None of ASALS)
	Regional Devel. Authorities (KVDA, etc.)	Small and medium-sized Centralized schemes	Italians: Wejwei Turkana Rehabilitation Project
	Ministry of Settlement		Magarini
	NIB	Large centralized Govt. schemes	No ASAL projects
<u>FORESTRY</u>	HENR Forestry Dept.	Chief's nurseries Afforestation Wood lots	EMI, Machakos, Kitui, Baringo, Turkana, W. Pokot, Elgeyo/Marakwet, Taita/Taveta, Turkana Rehab. project
	MOA	Fruit trees Fodder trees Farm tree planting Catchment conservation	Kitui
	Regional Dev. Authorities	Conservation around hydro-electric sites	Turkana (Norad)
<u>INCOME GEN./or Non-Farm Activities</u>	KIE (MTI)	Blocks of workshop facilities for artisans	Machakos
	Youth Polytechnics (MCSS)	Vocational skills training	Machakos, Kitui, Baringo, Turkana, W. Pokot, Elgeyo/Marakwet, Laikipia, Taita/Taveta
	Women's Bureau (MCSS)	IGPs for women's groups	Laikipia, W. Pokot, Elgeyo/Marakwet, Ndeya/Karai, Taita/Taveta, Kajiado



## KENYA

## ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

## ASAL Projects: Geographic Scope and Coordination

Project	Geographic scope	Locus of Planning, Coordination	Coordinating Ministry	% of Activities within District Focus
Machakos IADP	District (ASAL only)	District	MPND	100%
Kitui ASAL Project	4 (of 5) Divisions	I. National II. District	MPND	HOWD 100% DDC approved Soilcon outside
Embu/Meru/Isiolo	3 Districts (ASAL parts only)	I. Province II. District	MALD + Donor	I. Primarily outside II. Forestry inside MOA/LD Part inside/ part out
Baringo PPSAAP	1 Division	District	MPND MPND	100% DDC approved but not 100% DDC identified
Turkana	District	District	MPND	Project identified; 100% DDC approved (78% of budget in printed est. 60% of asked budget)
W. Pokot	District	District	MPND (DDO/DEC)	100% DDC approved, 90% DDC initiated
Elgeyo/Marakwet	District	District	MPND (DDO/DEC)	100% DDC approved, 90% DDC initiated
Ndena/Karai	2 Locations	District	MPND	Mainly project initiated 100% DDC approved
Lalikipia	District	District	MPND	90% DDC initiated 100% DDC approved
Taita/Taveta	District	District	MPND	50% project initiated 100% DDC approved
Kajiado RDP	District	District	MPND	Project initiated 100% DDC approved
Wamba ASAL Project	Division	District	MALD	No information
Community Action for Disadv. Rural Women (Cadsw)	17 ASAL Districts	National	MPND	None  (100% outside)

## KENYA

## ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

## Other Projects in ASAL areas: Geographic Scope and Coordination

Project	Geographic scope	Locus of Planning, Coordination	Coordinating Ministry	% of Activities	
				DDC initiated	DDC approved
IPAL	Division	?	Education	0	0
Turkana Rehab. Project	Division (S. Turkana)	Project/KVDA	KVDA (NERD)	0	0
WFP Support to Settlements in ASAL Areas	Parts of 4 Di...	Project: Sub-contractor	Sub-Contractors (NGO's, TRP)	0	0
Magarini Settlement	Irrigation schemes	Project	M. of Settlement	0	0
Mutemo RP	1 Division	Project	MAID	0	0
Garissa Irrigation Rehab. project	5 small irrigation schemes	Project	MAID	0	0
Weiwei Irrig. Rehab.	1 small irrigation schemes	Italian Contractor/KVDA	KVDA	0	0
Merti Irrig. rehab.	1 small irrigation scheme	Italian NGO Contractor/Diocese	None	0	0
Kwale/Kilifi	Irrig. schemes (coastal strip)	District	MPND	?	Most

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ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Mode of Channeling Funds (Asal Projects)

Project	% to be paid by donor	% to be paid by GOK	% to in AIE's	% Direct Payment	Imprest account
Machakos	?	?	50	50	yes
Kitui	60	30 *	10 ?	90**	no
Embu/Meru/Isiolo		-	?	100 %?	yes
Baringo	75	25	100 %	-	no information
Turkana	100	-	-	-	yes
W. Pokot	100	-	30	70	yes
Elgeyo/Marakwet	100	-	30	70	yes
Ndeiya/Karai	100	-	-	100	no information
Laikipia	100 *	-	-	100	no information
Taita/Taveta	100	-	-	100	no information
Kajiado	100	-	-	100	no information
Wamba	100	-	-	100	no information
Community Action Cadw	60	40	-	100	no

\* (Excluding self-help contribution.

\*\* Louis Berger Contract.

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## ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

## Technical Assistance: Asal Projects

Project	Year	Coordinat/ advisor	Agronomy	Soil Cons.	Water Devel.	Livestock	Forestry	Social Services	Health	Educ.	Other	Total T.A.
Machakos	79-85	1	1	1	2	-	-	-	-	-	-	5
	86	-	-	-	1	-	-	-	-	-	-	1
Kitui	80-83	1	-	1	-	-	-	-	-	-	2	4
	84-86	1	1	1	2	-	-	-	-	-	-	5
Embu/Meru/ Isiolo	82-85	1	-	2	-	2	2	-	1	?	?	9
	86	1	-	1	-	1	1	-	-	-	-	4
Baringo	80-86	1	1	1	-	1	-	-	-	-	-	4
Turkana	82-86	1	2	-	?	2	1	1	1	1	2	11-12
	87	1	1	-	-	1	1	-	1	1	1	7
W. Pokot	84-86	1	-	-	-	-	-	-	-	-	-	1
Elgeyo/ Marakwet	84-86	1	-	-	-	-	-	-	-	-	-	1
Ndeiya/Karai	84-86	1	-	-	-	-	-	-	-	-	-	1
Laikipia		1			?							
Taita/Taveta	86-89	1	1	-	2	-	1	1	-	-	-	6
Kajiado		1										Not yet avail.
Wamba		1	1	-	-	1	1	-	-	-	-	3
Community Action Cadre		-	-	-	-	-	-	1	-	-	-	1



## KFNVA

## ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

## Grassroots Receiving Mechanisms for Project Inputs &amp; Services

Project	Water Dev.	Soil Cons.	Agric. Extens.	Bulking Seed Distrib.	Forestry	Irrig. Rehab.	Goats	Bee Keeping	Range Rehab.
Machakos	Self-help groups	Self-help groups	Self-help groups	?	Self-help groups	-	?	Women's groups	Ranches
Kitui	Self-help groups	self-help groups	Contact farmers & self-help groups	Self-help groups	Self-help groups	-	Individual farmers	Women's groups	Group Ranches
Embu/Meru/Isiolo	-	Individuals & groups	-	-	Paid labourers	-	Individual Farmers & Women's groups	-	-
Baringo	None	None: FFW	Contact farmers	Individual farmers	None: FFW	Traditional farmers group ?	?	-	Group Ranches
Turkana	None	None: FFW	Irrigation schemes	-	None: FFW	Scheme Tenants' ASSN.	Individual farmers	-	?
W. Pokot	None	?	-	-	?	Traditional farmers groups	Individual farmers	?	-
Elgeyo/Maratwet	None	-	-	-	?	Traditional farmers groups	-	-	-
Ndeiya/Karai	?	-	-	-	-	-	-	?	-
Laikipia	Self-help groups	Self-help groups	-	-	Self-help groups	-	Women's groups	Women's groups	-
Taita/Taveta	?	Self-help groups & paid labour	-	?	None: paid labour	-	?	?	?
Kajiado	?	?	?	?	-	?	?	?	Ranches
Wamba	-	-	-	-	?	-	?	?	?
Community Action Cadres	-	-	-	Women's groups	Women's groups	-	Women's groups	Women's groups	-

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Achievements of ASAL Projects - Water Development\*

Project	Earth Dams/ Pans		Subsurface dams/sand dams		Rock catchments		Boreholes		Shallow wells		Springs/ pipelined systems		Storage Tanks	
	O	C	O	C	O	C	O	C	O	C	O	C	O	C
Machakos														
Kitui MOWD	2	2	3	2	6	6		2		9	6	1		
MOA				41	4	32				4		2		
Baringo		14 rehab.		10 large 27 small							2			
Turkana														
W. Pokot							2 rehab.		40 taract.		2			
Elgeyo/ Marakwet								2 new			5			
Ndeiya/Karai														
Laikipia	4	1						1 reh.			2		2	1
Taita/Taveta														
Kajiado														
Wamba														

O = Ongoing.

C = Completed.

\* Line Ministries and donors are kindly requested to assist in completing/correcting/updating the figures.

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Achievements of ASAL Projects - Other Components\*

Projects	Soilcon Km of Terraces	Hand Tools Distrib.	Nursery assisted	Seedlines Planted/ 500 000 Yr	Survival Rate (Seedlines)	Improved Goats Distrib.	Cattle DIPS	Educ.	Health Centres	Women's Grps assisted for IGP's
Machakos	8 000									
Kitui	2 800	45 000	22	500 000 Yr			6?	-	-	55
Embu/Meru/ Isiolo	35		32					1 hosp.		-
Baringo	3 728 Check dams			400 000 Total			4			-
Turkana										1
W. Pokot			4				3 new + 3 rehab.	2 schools		1
Elgeyo/ Marakwet			10 MFNR + 4 MDA				2 new + 30 rehab.	4		40
Ndeiya/Karai	-	-	-	-	-	?	-	-	-	?
Laikipia	-	-	-	-	-					?
Taita/Taveta										Too soon
Kajiado										
Wamba										
Community Action Cadre										17

\* Line ministries and donors are kindly requested to assist in completing, updating and correcting figures.



## KENYA

## ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

## Self-sustainability of Benefits, by Activity (ASAL Projects)

Project	Water Devel.	Soil Conserv.	Agronomy	Water Harvesting	Irrig. Rehab.	Affores- tation	Range Improvement	Bee Keeping	Income-gen. projects
Machakos	HI	HI	Med.	-	-	Med.	?	HI	-
Kitui	HI	HI	Low	Low	-	Med.	Low	Low	-
Embu/Meru/ Isiolo	-	?	Low	-	-	?	-	-	-
Baringo	?	Low	Low	Low	High	Low	Low	-	-
Turkana	Low	Low	?	Low	Low/ Med.	Low	Low	-	Low
W. Pokot	Med.	?	-	-	?	?	?	-	?
Elgeyo/ Marakwet	Med.	-	-	-	?	?	?	-	?
Ndeiya/Karai	?	-	-	-	-	-	-	-	Low
Laikipia	?	?	-	-	-	?	-	?	Low
Taita/Taveta	-	?	-	-	-	-	-	-	?
Kajiado	-	-	-	-	-	-	-	-	-
Wamba	-	?	?	-	-	?	?	-	?
Community Action Cadw	-	-	-	-	-	?	-	?	Low

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Asal Project Budgets: Resource Allocation by Component

BARINGO (planned expenditure)

Soil/Water Conservation	8.2 %
Agronomy/Irrigation	8.7 %
Livestock	14 %
Rural Services	12.6 %
Project HQ (Construction)	23 %
Staff/Survey	30 %
Development Fund	4 %
<u>TOTAL</u>	<u>100.5 %</u>

TAITA/TAVETA

Water Development	9.7 %
Soil Conservation	13.8 %
Forestry	15.6 %
Agriculture	5.9 %
Improvement of Facilities	3 %
Administration	4 %
Vehicle Operation	10.8 %
Survey/Studies/M + E	4 %
<u>TOTAL</u>	<u>66.8 %</u>

KITUI PHASE II

% of USAID Contrib.    % of GOK + USAID

Water Development (Mowd)	52 %	32 %
Soil/Water Conserv./Agronomy (MOA)	29 %	35 %
Forestry (MENR)	2 %	2.5 %
Livestock (MLD)	6.5 %	10 %
Community Organization (MCSS)	6.9 %	5 %
Planning + Administration	3.5 %	14 %

EXISTING ASAL PROJECTS

Terms of Reference

- Object: To compile additional information on achievements of existing ASAL projects and synthesize them in a paper for presentation at the workshop.
- Qualifications: Seven years of experience in project planning, implementation and evaluation (preferably with Min. of Planning, GOK).
- Terms of Reference: The person selected will gather and systematize information from all ASAL projects regarding achievements, numbers and types of beneficiaries, cost benefit ratios and cost per beneficiary of components in water development, soil conservation, agronomy, forestry, community development, livestock and income-generating activities. The information should be presented in a series of matrices similar to those illustrated in Annex 1.

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ANNEX 2

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ACRONYMS

PEM = Protein - Energy Malnutrition  
RDF = Rural Development Fund  
T&V = Training and Visit

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

THE TARGET GROUP

I. INTRODUCTION

1. The arid and semi-arid lands are one of Kenya's poorest areas. At the time of the last population census (1979), approximately 5 million people, or one third of Kenya's population, lived in ASAL districts. Since the boundaries of arid and semi-arid ecological zones do not coincide with district boundaries, the total includes people living in high and medium potential zones in transitional districts. This population can be divided into three broad categories: (a) smallholders engaged in mixed farming on marginal lands; (b) pastoralists who engage in farming on a limited basis; and (c) pure pastoralists (including nomads).

2. No reliable figures exist on numbers of smallholders relative to pastoralists, but the World Bank estimated total numbers of pastoralists as around 1 million (World Bank 1982: Collier and Lal). On this basis, approximately 80% of the population in ASAL districts would be farmers and the remaining 20% would be pastoralists. However, when the smallholder population living in high and medium potential zones of transitional districts is subtracted, approximately 70% of the population would be mixed farmers and 30% pastoralists. In 1976, only 20% of the pastoralists were reported to engage in agriculture, but today, at least 60% engage in agriculture on a limited basis.

3. World Bank estimates for Kenya as a whole, of the incidence of poverty among different categories of rural households are shown below. Among nomadic pastoralists, the incidence of poverty is the highest in Kenya (85% below the poverty line). It is also very high among migrants to drylands (55% below the poverty line) and relatively high among sedentary pastoralists (33%). All three of these categories of poor are found only in ASAL areas.

Percentage of households within rural subgroups below the poverty line

<u>Rural Group</u>	<u>Percentage below poverty line</u>
Large/intermediate farmers	0
Smallholders	29
Migrants to drylands	55
Squatters	33
Migratory pastoralists	85
Sedentary pastoralists	33
Landless with good occupations	0
Landless with poor occupations	50

Source: World Bank, 1982, 2.



## II. DEMOGRAPHIC TRENDS IN ASAL AREAS: IMPLICATIONS

### A. Population Growth and Distribution

4. In comparison with rural areas in other parts of Kenya, the ASAL areas are characterized by relatively low population density and higher than average annual population growth rates, due to the combined effects of natural increase and migration. Table 1 (appendix) shows the population census (1979) and projected population in 1986. Map 1 shows population density. Table 2 shows population growth rates by district. Districts in the Northeast (Wajir, Mandera, Garissa) have the lowest density and the highest growth rate (4.6% annually), followed by parts of the Rift Valley (4.3%) and Eastern Province (4.04%). Many ASAL districts are also characterized by a severe imbalance in the sex ratio of the population of prime working age, which is evidence of widespread male outmigration.

### B. Migration

5. Three migratory trends are of particular importance in the ASAL areas: (a) temporary outmigration in search of income-earning opportunities; (b) return migration from Nairobi and Mombasa; and (c) permanent migration into marginal dryland farming areas.

6. Temporary outmigration - Numerically, the most important migratory phenomenon in the ASAL areas is temporary outmigration of males in search of work. The reason for this migration is that most dryland farming and pastoralist households are unable to earn enough cash from farming and herding alone. The migration rate is higher in the marginal mixed farming belt than it is in the remote districts. The main migratory flow from Machakos and Kitui is to Nairobi and Mombasa. From Taita-Taveta, Kwale, Kilifi and Tana River, Mombasa is the main destination. In Baringo, Elgeyo/Marakwet and West Pokot, the main flow is toward the large-scale commercial farming areas in the Rift Valley.

7. Table 3 shows, for each district, under the heading of "outmigration", what percentage of people born in that district were living outside the district at the time of the 1979 population census. Under "immigration" it shows what percentage of the population living in the district in 1979 were born outside the district. The right hand column shows the sex ratio of migrants.

8. When seasonal migration is included, outmigration rates are much higher. For example, the socio-economic survey done for the Marginal and Semi-Arid Lands Pre-Investment Study revealed that 40% of the adult males in Machakos and Kitui Districts were working outside the district. In the ASAL areas, temporary outmigration increases sharply during drought years and falls in years of good rainfall. In years of adequate rainfall, men in Elgeyo/Marakwet only stay away three weeks; in drought years, they stay six months on average (Dubel and Kwaasteniet, 1984). In a mixed-farming area in Kitui, 60% of the men of working age migrated during the 1983 drought (O'Leary).

9. Return migration - The second most important migratory current picked up by the census is return migration (mainly from urban areas). Only a minority of migrants to Nairobi and Mombasa can afford to support themselves and their families in the city after they are too old to find steady work; the majority return to the farm. It is in the migrant's own interest to ensure that his family maintains the farm as a security cushion to fall back on if he loses his job or is too old to find work.

10. Permanent immigration - It is often claimed that environmental degradation in ASAL areas is a direct consequence of immigration of excess population from the high and medium potential zones, who apply inappropriate agricultural techniques. However, when immigration data from the population census is disaggregated by province of origin (see Table 4), it becomes clear that immigration to ASAL districts from outside provinces is very limited in scale. The majority of immigration to ASAL districts comes from within the same province or a contiguous province.

11. This conclusion is corroborated by the findings of the Marginal and Semi-Arid Lands Pre-Investment Study. The annual population growth rate in areas where former rangeland is being brought under dryland cultivation is very high (14% per annum in Yatta Division of Machakos), but the overwhelming majority of migrants are local. In Machakos and Kitui, 24% of the sample had been born on the same farm, and 76% had moved to another farm in the last ten years. Half of those who had moved remained in the same sublocation; 13% moved to another sublocation; 36% moved to another location in the same district and only 0.2% were migrants from outside the district (Volume 6: Human Resources and Social Characteristics). The most commonly expressed reason for migrating and establishing a new farm was land shortage (66%).

#### C. Expansion of Cultivation into more Marginal Agro-Ecological Zones

12. It is commonly asserted that in ASAL areas, dryland cultivation is rapidly expanding at the expense of grazing. However, it is difficult to find hard data to show what is happening. Map 2 shows the relation between cultivated areas and the semi-arid and arid zones. It is clear from the map that in Kitui, Embu and Baringo, the outside boundary of cultivation has already penetrated into the arid zones. However, in Machakos, an aerial photographic survey commissioned by the EEC project, which compared land use patterns on the same sampling areas at 5 year intervals, failed to find statistically significant evidence to support the assertion that the boundary of cultivation was extending into more marginal zones. In spite of this, rapid growth of cultivation on the fringes of ranching areas has clearly been documented (see Annex 8: Livestock).

#### D. Population Growth in Relation to Land Carrying Capacity

13. A study of population growth in relation to land carrying capacity was completed for Machakos, Kitui and lower Embu in connection with the Marginal and Semi-Arid Lands Pre-Investment Study. Results published in volume 6: Human Resources and Social Characteristics, show that under hypothesis 1 (households are expected to derive 100% of their subsistence from cultivation alone), in 1977, carrying capacity had already been exceeded in the entire Machakos District and half of Kitui District. Under hypothesis 2 (households derive 60% of their subsistence from crops and the rest from other sources), one third of the locations in Machakos had already

reached the limit of their carrying capacity, one third would reach it by 1990 and the remaining third by 2000. In Kitui, the highlands would reach the upper limit of their carrying capacity by 2000; the rest of Kitui and lower Embu would have another 40-60 years (Bernard and Thom, 1978). Actual analyses of household income sources suggest that the "partial subsistence" model is much more realistic than the "full subsistence" model. It is doubtful that ASAL households ever relied on crop production as their sole source of subsistence.

14. In Kajiado District as well, studies of range carrying capacity in relation to livestock numbers reached the alarming conclusion that carrying capacity had already been exceeded. However, on the basis of more recent information, it appears that these studies underestimated carrying capacity (see Annex 8).

#### E. Food Security

15. Figure 1 (appendix) shows seasonal variations in food security by province in 1978-79, using the level of food stocks as an indicator. The graph shows that, of all provinces covered by the study, food security is most problematic in Eastern Province (which is the only province where the sampling frame gave significant weight to ASAL areas). Maps 3 and 4 show food relief per capita by district and districts receiving food relief (1973-83). It is clear from these maps that famines occur frequently and that drought relief in ASAL areas absorbs enormous economic resources. In Baringo District, the Pre-Investment Study found that 85% of survey households reported seasonal food shortages, and 49% reported hunger as "common". The average duration of food shortages was 122 days. In Machakos, Kitui and lower Embu, food shortages were even more common (Volume 6: 5.9).

#### F. Nutrition

16. The Third National Nutrition Survey (1982) revealed that chronic protein-energy malnutrition (or "stunting") of children under age 5 is a serious problem in Kilifi, Tana River, Lamu, Kwale and Kitui Districts (see Table 5). It is not a serious problem in Taita-Taveta, Meru, Elgeyo/Marakwet, West Pokot, Baringo and Laikipia. Embu and Machakos are somewhere in between. Acute PEM (or "wasting") is not a serious problem anywhere. The remote ASAL districts were not covered by the survey, but findings from limited samples suggest that, because the pastoralist diet is milk-based, children's nutritional status in these areas tends to be better than in other parts of Kenya.

17. In Turkana District, a survey of households congregated around Katilu irrigation scheme revealed that the nutritional status of children was best among the nomadic pastoralists; next best among shopkeepers/traders; adequate among off-scheme households; adequate among people living in famine relief camps; and worst among scheme tenants (Broch-Due).

### III. DIFFERENTIATION WITHIN THE TARGET GROUP

18. As noted in the introduction, the population in the ASAL areas falls into three broad categories: (a) smallholders engaged in mixed farming in marginal areas; (b) pastoralists who engage in farming on a limited scale; and (c) pure (migratory) pastoralists. This section examines differentiation between categories, and within each category, on five key parameters:

- resource base (land, livestock, capital, other assets)
- income sources (crops, livestock, off-farm earnings)
- labour allocation (division of labour, role of women)
- investment patterns
- strategies for dealing with risk.

#### A. Mixed Farming Systems

19. Approximately 70% of the population in ASAL areas is engaged in mixed farming. The degree of integration between crop and livestock production varies greatly. In the highlands of Machakos, where grazing land is scarce, the two activities tend to be integrated: cattle are increasingly fed crop residues and manure is applied to crops. In lower Embu and much of Kitui, where herds can be grazed on common lands, the two are separate: crop residues are not an important source of fodder and manure is not applied to crops.

#### The resource base: distribution of land and other assets

20. In the mixed farming areas, population pressure has led to subdivision of holdings into units which are too small to support a family without recourse to outside earnings, especially in ecozone IV. Table 6 shows the percentage distribution of households, by holding size, in provinces having part of their land in ASAL areas, as revealed by rounds 2-4 of the Integrated Rural Survey. In 1979, in Eastern Province, 81.6% of the survey households held less than two hectares, 60% held under one hectare and nearly 20% had no cropped land (although they may have had livestock). In Coast Province, households with less than two hectares were 76% and in the Rift Valley, 75.4%. Virtually all of the holdings were owned (less than 1% rented). In Eastern Province, 71% of the households with holdings had only one parcel; in Coast Province, 88%; in the Rift Valley, 92%.

21. The Marginal and Semi-Arid Lands Pre-Investment Study, reports considerably larger holdings (see table below), but much of the land reported was not under crops. In Machakos, Kitui and lower Embu, 43% of the holdings were under 2.8 ha (7 acres) and 60% were under 4 ha (10 acres). In Baringo, 67.5% of the holdings were under 7 acres and 80% under ten acres. But 78% of the area actually cultivated was below 3 acres and 15% was below 1 acre.

Percentage of holdings by holding size in 4 ASAL districts (1978)

Holding Size (acres)	Machakos, Kitui, Lower Embu	Baringo
0-0.99	1.1	9.5
1-3	16.7	30.5
4-7	25.7	27.6
8-10	17.3	12.6
11-15	11.1	5.2
16-20	9.6	4.7
21-30	11.0	4.0
over 30	7.5	6.0
Total	100%	100%

Source: Pre-Investment Study, Volume 6: Human Resources and Social Characteristics: composite of two tables in text.

22. At the time of the Pre-Investment Study (1978), the process of land adjudication was nearly complete in Embu, midway in Machakos and in its earliest stages in Kitui and lowland Baringo. Today, nearly all of the cultivated land and most of the rangeland in ASAL districts has been adjudicated. At the time when the ASAL programme was formulated, land adjudication was controversial. ASAL planners considered it a "necessary prerequisite for development and improvement of the marginal lands" (Vol. 6: 51), but anthropologists were highly critical of its social impact. The arguments for and against land adjudication were the following:

ARGUMENTS FOR LAND ADJUDICATION

- Conflict reduction: in the face of growing land shortage, definition of boundaries was expected to reduce conflict.
- Cash crop promotion: registration of individual ownership was expected to facilitate expansion of the area under cash crops.
- Land conservation: land degradation was attributed to the lack of incentive for conservation under communal tenure; adjudication was expected to lead automatically to more sound resource conservation practices.
- Individual or group ownership was assumed to be necessary for access to credit, which was considered a prerequisite for intensification of crop and livestock production.
- Group ownership of rangeland was expected to facilitate upgrading of livestock production.

ARGUMENTS AGAINST LAND ADJUDICATION

- Ignores traditional inheritance laws;
- Makes land distribution more skewed than before;

- Creates landless and near landless classes;
- Leads to increased concentration of better holdings in the hands of a few influential families who are able to manipulate the legal process of adjudication to their advantage;
- Forces poor and powerless households out of the highlands and into the arid areas;
- Women lose their traditional land rights;
- Instead of decreasing conflict, adjudication increases conflict over land between neighbours and within families;
- Has no effect on land consolidation; aggravates fragmentation in the long run;
- Title has no effect on production or conservation;
- Possible to design credit programmes where land title is not necessary for access to credit.

23. In retrospect, evidence from ASAL areas suggests that land adjudication: (a) failed to have the expected impact on production or conservation, especially in rangeland areas and (b) definitely aggravated inequitable distribution of farmland. In Embu, adjudication hastened the transition from pastoralism to mixed farming; pastoralists who lost their access to dry season grazing areas in the highlands began growing crops because dry season milk supply was inadequate. In pastoral areas, where land was adjudicated to groups rather than individuals, boundaries of group ranches have not been viable during serious droughts. With the spread of cropping, pressures for subdivision of land rights have emerged in Kajiado, but for cropping as opposed to grazing (see Annex B). The livestock annex argues that adjudication is a necessary (although not a sufficient) condition for improving range management, but the present annex argues that it is neither necessary nor desirable.

24. In Machakos, Kitui, lower Embu and Baringo, the Pre-Investment Survey (1978) revealed that private field cultivation was not yet dominant outside of Machakos.

Farming System	Machakos	Kitui	Embu	Baringo
Private field cultivation	65%	20%	35%	17%
Settled (bush fallow) agric.	10%	21%	65%	-
Settled agric. dominant	9	-	-	14
Shifting cultivation dominant	-	8	-	30%
Grazing dominant	-	-	-	35%
Commercial ranching	9	5	-	-
Large-scale farming	6	-	-	-

Source: Pre-Investment Study, Volume 6: composite of two tables in text.

25. Access to animal draught power varies by district. The Pre-Investment Inventory showed that in 1978, in Machakos and Kitui, only 42% of the households used animal draught; 60% prepared their land by land tillage. In Baringo, only 1% owned draught animals; 91% of the households used hand tillage to prepare the land and 8% used tractors.

26. Livestock holdings among mixed farming households are also skewed. In the highland areas of Kitui, only the wealthiest households own 5 or more heads of cattle, which they entrust to a herdsman who grazes them down on the statelands. The middle stratum keeps a few cattle for draught purposes. The poor only keep goats (O'Leary).

#### Income Sources

27. In the marginal mixed farming areas, self-provisioning crop production is the main source of food, but cash income comes primarily from labour migration, sale of livestock and non-farm production. Most households are food-deficit producers except in good years. Although food-deficit producing households sell small quantities of crops to get cash at harvest time, income from sale of crops is a relatively minor share of total cash income.

28. The key factor in the dynamic of poverty is crop failure. In agro-ecological zone IV, crops fail 2-3 years out of ten; in zone V, they fail 3-7 years out of ten. Whenever crops fail, households are forced to fall back on other income sources to buy the food they need. In times of crop failure, the price of goats relative to grain goes very low (Mutiso). Under these circumstances, non-farm earnings play a stabilizing role as a hedge against crop failure. They enable households to get through a series of bad years without selling off their land and livestock. When households are unable to avoid selling off most of their land and livestock, they become wholly dependent on non-farm earnings for survival.

29. Machakos - Both deficit and marginal surplus producing households depend on off-farm income as the main source of cash. Off-farm income is especially important in enabling them to survive poor crop seasons. However, with the exception of the wealthiest households (such as shopkeepers and civil servants), off-farm earnings alone are never enough to support a family. Therefore, 80-90% of the population depend on subsistence production to meet at least part of their basic food consumption needs (Meyers).

30. Kitui - Although the economic base is agriculture, the main source of economic accumulation is outside agriculture. Farm earnings account for only 26% of total household income, whereas off-farm employment (regular and casual) accounts for 31.5%, non-farm activities for 25% and remittances for 18%. All households buy some food items, and a majority must purchase maize during the period before the main harvest. Seventy percent of the adult men and women engage in off-farm work at some time during the year, and 30% of the men have full time off-farm work. The main off-farm activities of women are beer brewing, honey production, pottery making, basket weaving, working for wages on other farms, selling food and handicrafts, and petty trading. At any given time, 40% of the adult males are working outside the district (Carloni and Horenstein).

31. Off-farm and non-farm income sources differ at the top end and the bottom end of the economic continuum. The upper stratum's main sources of cash are urban remittances, shopkeeping and large cattle herds which are grazed in the statelands. The lower stratum's main income sources are casual employment, charcoal making, honey, beer brewing and unlicensed vending at water points. The middle stratum depends more on farming and less on outside income sources (O'Leary)

32. Taita Hills - In the higher altitude zones, households engage in cash crop agriculture as a hedge against failure of staple food crops and staple crop production as a hedge against failure or falling prices of commercial crops. In the low potential zones, they utilize wage employment as a hedge against failure of staple crops and grow staple crops as a hedge against loss of employment (Fleuret and Fleuret).

33. Embu - About a third of the household have some regular non-agricultural income, but only 10% have white collar jobs; 13% operate small businesses such as butcheries, bars, tea shops or retail shops (mainly in ecozone IV, where demand is greater and markets better developed). Assets such as land, oxen, ploughs and tree crops are concentrated among those with substantial non-agricultural income. In lower Embu, poor households' main cash earning activities are charcoal making, casual labour, sisal rope making and beer brewing. Cotton is the main cash crop but returns are very unattractive in comparison with charcoal (Hagerud). In Mbeere, case studies reveal that off-farm activities (mainly migration to upper Embu) account for 40% of household income, crops (including own consumption) 47% and livestock sales 17% (Hunt).

#### Labour Allocation

34. Serious labour bottlenecks occur in the marginal mixed farming areas as a result of three main factors: (a) scarcity of water during the dry season, (b) seasonality of production (dependency on the timing of rains) and (c) male migration. Although the calendar of farm activities differs greatly between Eastern Kenya (which has two rainy seasons) and Northwestern areas of the Rift Valley (which have a single, but longer rainy season), both areas experience labour bottlenecks at planting time.

35. Kitui and Machakos - Before the colonial period, men were responsible for building huts, making tools, trading, hunting, herding and curing skins. Women were responsible for food production and domestic tasks. Under colonial rule, men were increasingly drawn into migratory labour and cash crops production. Women continue to be responsible for subsistence production. According to custom, men clear fields, plough, tend livestock and spread manure. Women are responsible for selecting seed, planting, hoeing, weeding, harvesting, carrying, drying, threshing, winnowing and storage; they are also responsible for milking cows, gathering firewood, fetching water, grinding grain, processing and preparing food. Women now participate in all farm operations, and in men's absence (40% of the adult males are working outside the area), they increasingly clear and plough land and tend cattle.

36. Labour requirements for essential but un-remunerated domestic activities severely limit time availability for farming. Of the average 15 hour workday, women spend at least 5 hours collecting water, up to 3 hours cooking, and about 45 minutes gathering firewood, in addition to their agricultural work. Figure 2 shows the calendar of farm, domestic and non-farm production in Kitui. A severe bottleneck occurs in the system at the onset of the rains, when labour requirements for domestic water supply overlap with preparing and planting the shamba.

37. One half of the households in the Kitui project area walk over 5 miles round trip to the nearest water source and live on 5 litres a day per person during the dry season. Women are forced to spend from 8 am until noon or later making a daily trek to fetch water. At the onset of the rains, the timing of agricultural operations is critical, and late planting is the largest single cause of low yields. Just when women should be working full time on the shamba, they must use valuable time fetching water from distant



water points. Until these labour constraints are relieved, women will not have enough time to increase production in agriculture (Carloni and Horenstein).

38. Down in the millet and sorghum growing areas of lower Kitui, another important labour bottleneck occurs for bird scaring. In contrast with the marginal Katumani maize zone, intercropped millet, sorghum, pigeon pea, cowpeas and green gram require almost continuous sustained labour inputs due to the staggered timing of the various harvests.

39. Lower Embu - The situation in Embu is very similar to that of Machakos and Kitui: women bear the main burden of farm labour and their time is stretched to the limit. Table 7 shows the sexual division of labour.

40. Sample households used an average of 63 litres of water per day or 11 litres daily per person. Collecting this quantity of water on foot requires three or four trips to a river or water hole each day. In addition to this, about a quarter of the households make an additional trip or two daily for livestock watered at home. Each round trip takes 30-90 minutes, depending on distance and terrain. Water collection times are somewhat reduced during the two annual rainy seasons for households with rainwater catchment tanks. Though 52% of the cotton zone residents own such a tank, most are oil drums which only store enough water to last 2-3 rainless days. Below 1280 metres, rainwater catchment in oil drums is usually sufficient for no more than a couple of months per year (Hagerud, 1984).

41. Agricultural production easily consumes all labour time available after completing household maintenance tasks. With only a few simple hand tools (machete and hoe), producing enough food to meet family subsistence needs requires enormous time and energy. The labour constraint is so severe that many owners of medium-sized farms say inadequate labour prevents them from cultivating all of their land. Although poor cash returns to agriculture explain why some very large land owners cultivate only a portion of their farms, many smaller owners who want to cultivate larger areas are unable to do so because of insufficient family labour and inadequate cash to hire additional labour. In the cotton zone, the average proportion of the total hectareage that is actually cultivated is only 56%.

42. Widespread family labour shortages are alleviated in part through hired labour and traditional communal exchanges. Nearly two thirds of the sample households used some hired agricultural labour during the 1980 long rains, although 57% of these spent no more than \$15 on such labour. No more than a fifth of the sample spent more than \$40 on hired labour than season. Because hiring or exchanging labour is often essential in periods of peak demand in the agricultural cycle, it is not uncommon to find households hiring labour both in and out (Hagerud, 1984).

#### The Role of Women

43. As noted above, women are the main source of labour for crop production (for a detailed breakdown of the division of labour, see Table 8a in the appendix). Widespread male migration and its consequences for women's workload have already been discussed. Women's time constraints are a critical bottleneck in the farming system. In Kitui, women head 40% of all rural households (11% de jure and 29% de facto) and manage 60% of all farms. Husband and wife have separate, non-pooled income streams: except in times of emergency (when the household has to sell animals to buy grain), the wife's earnings are the main source of cash for everyday consumption and the husband's earnings are earmarked for larger investments.

#### Investment Patterns

44. Investment patterns vary sharply in different ecological zones and between socio-economic groups. In the lowland areas of Kitui, the upper stratum has used urban remittances to invest in shopkeeping and large cattle herds which are grazed in the statelands. Shopkeeping gives them the leverage to accumulate further wealth, especially in bad years, when poor households are forced to exchange goats to buy maize meal (O'Leary, 1980). In the highlands of Kitui, the upper stratum has used remittances and salaried wage earnings (a) to buy up land from marginal farmers hit by drought and (b) to diversify into commercial activities (Mutiso, 1977). They have claimed vast areas of the Yatta Plateau for commercial ranches which restrict grazing rights to members (O'Leary). In both Kitui and Embu, wealthy households from the highlands are speculating in land purchases down in the millet zone, where cultivation is rapidly encroaching on rangelands (Mutiso, Brokenshaw).

45. Investment in cash crops is much less common, and occurs primarily in the highlands. In Machakos, only the households with a steady off farm income to fall back on are willing to borrow from commercial banks to invest in cash crop production (Meyers). In Embu, the upper stratum has used regular non-agricultural income to acquire productive assets such as land, oxen, ploughs and tree crops in addition to small businesses such as butcherries, bars and retail shops (Hagerud).

46. All three strata invest in children's education, each according to its own economic possibilities. Son's education is given priority because girls marry out. Secondary education is a strategy for getting one or more sons out of agriculture, thereby reducing pressures to subdivide land. A son with regular, salaried employment is a form of "insurance", because he can provide for his parents when they are too old to farm.

47. In summary, the main investments of the wealthy are in the following areas:

- commerce and small business;
- land purchase;
- cattle herds and commercial ranching;
- secondary and college education for sons;
- (to a lesser extent) cash cropping.

Most of the poor's cash earnings are spent on consumption (especially food). Investments are limited to goats, education of sons (Primary level) and (to a lesser extent) working capital for small scale non-farm enterprises.

#### Strategies for Dealing with Risk

48. In all socio-economic groups, households' principal strategy for dealing with this risk is to diversify income sources. Goats are held as a form of savings which can be readily converted into cash in times of need. However, goats are a poor investment, because in times of famine, their local market price drops sharply relative to maize meal.

49. For this reason, most ASAL households increasingly depend on off-farm earnings to get them through bad years. Those household members with the highest off-farm income-earning capacity (men of prime working age) migrate or work off the farm. Those with low off-farm earning capacity, a low probability of finding work (old people, children), or high off-farm opportunity costs (women) remain in farming. Off-farm earnings enable families to avoid having to sell of their income-producing assets (livestock, land) in times of distress.

50. The Pre-Investment Study asked sample households what they could do to protect themselves against future droughts. The table below shows their responses:

Response	Machakos/Kitui/Embu	Baringo
Nothing	38.2%	20.5%
Buy more land	8.9%	16%
Keep more animal	5.0	11%
Migrate; work in town	9.9	1%
Use better farm methods	-	22%
Preparing soil	4.4	-
Cultivate more land	4.1	-
Store food	5.3	-
Improve farm	4.0	-
Pray	-	10%
Other	20.2	20.5%
TOTAL	100%	100%

Volume 6: composite of two tables.

51. Within the farming system, farmers hedge bets differently in the marginal maize areas than they do in the more arid areas.

52. Marginal maize areas - Households plant part of their land with drought resistant (Katumani) maize (which does better than local maize in bad years but is less resistant to pest damage and stores poorly) and part with local varieties (which do better in good years); they start preparing land by hand with a machete (scratching holes for seeding) if they are afraid of not getting a team of oxen to plough on time, they space plants widely (to make maximum use of moisture), they keep production costs to a minimum (Katumani seed and land preparation are the only expense), they reduce weeding by ploughing late, and they intercrop (Franzell). Because it increases moisture for crops, fanya juu terracing is also a risk reducing strategy. Table 9 compares the crop production strategies of poor versus wealthy farmers in a marginal maize zone.

53. Lower Kitui and Embu - To spread risk, households grow plots of millet or sorghum intercropped with cowpea, green gram and pigeon pea in addition to Katumani maize; they practice forms of minimum tillage; they stagger planting (or make a separate plot at the foot of the escarpment); they space plants widely and they adjust their labour inputs depending on whether the crops are doing well.

54. West Pokot - In the Sangat area, households plant maize on the traditionally-irrigated plots, finger millet (under shifting cultivation) up on the escarpment, and in times of drought, when the maize harvest fails, the elders organize communal labour for growing rainfed sorghum (Dubel and

Kwaasteneit). Before maize was introduced, sorghum was planted twice a year (in March/April as a rainfed crop and during the dry season under irrigation). The main reasons for replacement of sorghum with maize are: (a) labour constraints (maize is less work) and (b) growth of individualism, (weakening of exchange labour tradition, especially among youth).

55. Elgeyo/Marakwet - In Mon location (Kerio Valley), finger millet is given priority over maize and is planted nearest to water; households in the same clan plant it close to one another, to facilitate irrigation, fencing and bird scaring. When the rains are late, farmers plant a short duration variety. An early-maturing local variety of maize is planted further down, where the water doesn't always reach. Sorghum is of decreasing importance, as its cultivation is very labour intensive (children are in school) and it stores poorly. Some sorghum is planted among finger millet to distract birds (Dubel and Kwaasteneit).

## B. Pastoral Systems

### The Resource Base

56. ASAL areas are characterized by a declining ability to ensure basic subsistence to an increasing population through pastoralism at existing levels of technology. Overall herd numbers have increased with population increase to the point where the rangeland's carrying capacity is fast approaching the limit. In spite of this overall increase in herd numbers, livestock holdings are skewed. The majority of households have too few livestock units to cover both their food consumption and their growing cash needs. A study of livestock distribution on a group ranch in Samburu District revealed that 47% of the households own under 20 head, and 73% own under 40 head, while a small elite (7%) owns 180 or more (Perlov, 1982). Among the Il Chamus in Njemps location of Baringo, the upper 10% of the households own an average of 166 stock units per family and control 46% of the total stock; the lower 40% of the households, who own 1-9 stock units, control only 6% of the total stock (Little). Among the Maasai, small producers have only one fifth as many total livestock units (TLU) per capita as large producers. Milk consumption is much lower, and annual income from livestock is not enough to cover subsistence (see Annex 8: Table 18).

57. In pastoral systems, the critical factor at household level is milk supply during the dry season. When the livestock units per capita are too few to give enough milk for subsistence, households are forced to supplement the traditional pastoralist diet (of milk and blood) with grain to make up the shortfall. This increased dependency on grains has been documented among the Maasai (Jensen), Turkana (Ellis & McCabe), Samburu (Perlov), Il Chamus (Little), Rendille (O'Leary), and the Orma (Ensminger). Due to increased market dependency, the cash needs of pastoralist households are growing. Although sale of livestock (especially goats) is still the principal means of getting cash, due to a scissors effect in the cost of grain relative to livestock, households need to sell more animals each year to buy the same amount of grain (Little, O'Leary).

### Income Sources

58. In pastoral systems, livestock is the main source of income. What distinguishes pastoral systems with limited agriculture from pure pastoralist systems is the role played by self-provisioning crop production in reducing market dependency. Households which grow most of their own grain are able to conserve their herds; those which cannot grow grain are under

pressure to sell stock to buy posho. However, pastoralists (unlike mixed farmers) see selling their milking stock as a last resort, because the more stock they sell today, the greater the milk shortfall tomorrow. As a result, pastoralist households are increasingly relying on non-farm earnings and food for work to get grain during the dry season.

59. It is often asserted that pastoralists who engage in farming are the poorest of poor. However, evidence shows that this is not true in all cases. In Njemps (below), the better-off households were the first to take up farming; access to irrigated land is highly skewed, and the poor are not in a position to grow irrigated crops. As a last resort, some of the poor have turned to cultivating rainfed chance crops. Among the Samburu, the poor were the first to take up farming but now it is spreading to other groups. According to IPAL, all Rendille (wealthy or poor) plant crops on occasion. As for the Turkana, one author (Brown) asserts that cultivation is widespread, while another author (Broch-Due) says that only the poor plant crops.

60. Njemps Flats (Baringo) - Cultivation is a relatively recent phenomenon among the Il Chamus. Table 10 shows rapid expansion of the cultivated area. Ownership of irrigated land, however, is highly skewed: the top 10% of the farmers control 39% of the land; the top 20% of the farmers control 61%; and the top 40% control 91%. Households with access to irrigated land fall into two categories: (a) those producing enough to cover their consumption needs during the dry season and (b) those producing a surplus for sale. The first group of households are able to grow enough grain to avoid having to sell off their animals to buy food during the dry season, but they are unable to increase their wealth through farming. The second group is able to exchange surplus grain to acquire animals cheaply from poor households lacking access to irrigated land. This explains the high correlation between ownership of irrigated land and livestock wealth revealed by Table 11. The lower stratum, which has few animals and lacks access to irrigated land, depends on off-farm contract work (for the wealthy) to get money to buy food and poor households are increasingly planting-high-risk rainfed chance crops to reduce their dependency on the wealthy. Although livestock remains dominant in the system as a whole, access to grain is the key to wealth and poverty (Little).

61. Elgeyo/Marakwet - Terms of exchange between households in semi-arid valley and the highland farmers who supply them grain (in exchange for livestock) are deteriorating. Off-farm employment enables households to acquire grain directly (by working for small farmers in the highlands for a share of the harvest) or indirectly, by migrating to Eldoret to work on large maize farms to get cash which is then used to buy food. Local people prefer to work in the nearby highlands to get maize directly, but the demand for workers is limited because local farmers prefer to invest their profits in non-farm business instead of intensifying cultivation. Therefore most of the migration is to large scale farms outside the district.

62. West Pokot - The plains Pokot live in symbiosis with the agricultural hill Pokot, the former exchanging livestock for the latter's grain. Gold panning is the main source of non-farm income; returns are so good in comparison with farming that in gold panning localities, young men's labour is in short supply. Apart from gold panning, there are relatively few opportunities for off-farm employment.

63. Samburu - Again, the critical factor is market dependency during the dry season. Among pastoralists, cultivation is spreading rapidly. In one location, pastoralists began planting crops in 1981; within two years, 91% of the households were cultivating. Near Lorian swamp, 100% are cultivating.

Even in a remote corner of a group ranch, 13% are involved in farming as a secondary activity (Perlov). In the face of declining per capita livestock holdings, Samburu are increasingly working outside the district to get cash to buy food (to keep from having to sell off stock to buy grain in the dry season). Over one third of the herd owners were paid employees (army, police, game reserves) at some point in their careers and currently 40% of the warrior class is either in school or in wage employment; 10% of the men earn their cash from small-scale livestock trading; for the rest, the main sources of cash are sale of goats, hides and milk (Sperling). The poorest of the poor in the district are the Dorobo, who are dependent on beer brewing, charcoal and handicrafts to supplement shortfalls from marginal chance crop farming (Perlov).

64. Rendille - The Rendille are increasingly dependent on purchased posho, especially during the dry season. Case studies suggest that approximately 20% of household expenditures are paid for with non-farm wage earnings and remittances from people working in Marsabit or outside the district. Such gifts of money range from around 17% of the employed people's incomes in the wet months to 30% in the dry season when demands for help are highest (Njiru).

65. Turkana - A social-anthropological study of the Turkana commissioned by FAO in 1981 concluded that the Turkana have always grown chance crops of rainfed sorghum in natural pans and depressions where rain water collects, but it was overlooked in the past because farming is women's responsibility and crops get little attention (Brown). Another social-anthropological study (Broch-Due) documented women's heavy investment of time (and money) in rainfed sorghum plots in the area surrounding the Katilu irrigation scheme. Wherever it is practiced, agriculture is secondary; pastoralism is the dominant mode of production and main income source.

66. There are two categories of households which derive the majority of their income from non-farm sources: better-off households (butchers, shopkeepers, owners of posho mills, tea shops, "hotels", mechanics, etc.) and the poorest of the poor, whose main cash sources are sale of charcoal, doum-palm nut flour, casual labour and (recently) food for work (Brown). In Katilu, a survey showed that earnings from irrigated agriculture are so low that scheme tenants could not survive without non-farm earnings and rainfed off-scheme plots (Broch-Due, Talks).

#### Labour Allocation

67. A major labour bottleneck occurs in the pastoralist production system during the dry season. It is provoked by scarcity of water and forage. Men and youths (25% of the population) migrate with the cattle in search of better pasture. Women with small children remain in camp with the aged and infirm. Women have to walk farther to get water. Fodder has to be cut to feed the animals left at the camp. As more grain is consumed during the dry season, women have to spend much more time gathering firewood and cooking. When pastoralist households also practice agriculture, a severe labour bottleneck occurs at the end of the dry season, when labour requirements for land clearing/preparation overlap and conflict with those for herding (see Figure 2).

68. The Samburu have three strategies for coping with labour bottlenecks: family expansion (increasing the number of workers through marriage and reproduction); addition of outside workers (children "borrowed" from kin and hired workers from other tribes) and expansion of cooperative activity. During the dry season, only one fifth (21%) of the herding units were tended by family members working for their household; 27% were tended

by "borrowed" labour and the remaining half (52%) communally by others in the encampment (Sperling, 1984).

#### The Role of Women

69. Women's important contribution to pastoral production, household maintenance and domestic reproduction has already been highlighted with regard to labour allocation. Women also head a high percentage of the households congregated around police posts, missions and famine relief camps. When men lose most of their herds, they are no longer able to formalize marriage through the traditional exchange of animals. For this reason, the number of casual liaisons is increasing. The Turkana hold that any children born out of wedlock belong to the mother rather than the father, and the entire burden of their support falls on her (Broch-Due).

#### Investment Priorities

70. Increasingly, only the wealthier herd owners have a surplus (over consumption) to invest. In pure pastoral systems, surpluses are invested in animals. In pastoralist systems with limited agriculture, investment patterns are more complex. Figure 4 illustrates an investment model of an agro-pastoral enterprise in Njemp's location (Baringo). Smallstock is sold to prepare land and mobilize labour for irrigated agriculture to get maize; maize is partly consumed and partly sold to purchase more smallstock. Households with a large maize surplus are investing profits in sidelines such as shopkeeping (Little). (See Figure 2).

#### Strategies for Coping with Risk

71. Pastoralists' overall production strategies are discussed in detail in Annex 8. This section examines strategies for coping with particular types of risks, such as drought and raiding.

72. Coping with drought - One way of coping with drought is to split the household, with adult men and youths migrating in search of better forage, while old people, women and small children congregate around permanent water sources, living on emergency relief. In severe droughts, the territories assigned to group ranches are not viable and members have to move their herds to points outside the boundaries (Haldemann). Mutual aid between kin still serves an important cushioning function during drought, but it is reported that obligations to assist the poorest households are breaking down (Dyson-Hudson).

73. Strategies for protecting the household from the worst effects of future droughts appear to differ sharply between the older and younger generation: 69% of the older Maasai would increase the size of their herds but 64% of the younger Maasai would decrease herd size. The younger Maasai feel that the best way to protect themselves against future droughts is to grow crops and save cash (Campbell, 1979). Everywhere, male migration and off-farm work are reported to increase sharply in times of drought.

74. Another type of adaptation regards herd composition. The high proportion of reproductive females (50%) makes traditional herds especially suited to respond to drought. Deteriorating range conditions depress fertility, and drought produces anestrus, yet animals get in calf quickly as soon as the rains resume and grass begins to grow (Dyson-Hudson, 1984:172).

75. Strategies for dealing with risk of raids - In the past, it was common for households to loan-out some of their animals to members of neighbouring groups and take in some animals from outside, partly as a way of spreading risk and partly to create friendly ties and discourage inter-group raiding. It is reported that these reciprocal exchanges are breaking down (Dyson-Hudson). Another strategy is for households to divide their herds, keeping some animals in camp and some in the bush. In Marsabit, the more vulnerable members of the population are increasingly congregating around police posts (O'Leary). In Isiolo, households on Ewaso Ngiro irrigation schemes have given up keeping livestock because of continuous raiding (Van Doornen).

76. The sedentarization issue - Should the ASAL programme encourage sedentarization of migratory pastoralists or should it discourage it? To answer this question, we need to examine the sedentarization process, and where it fits in household survival strategies. It is important to distinguish between cases where households have become sedentarized as a last resort (having lost all their means of subsistence) and cases where households have chosen sedentarization as part of their strategy for coping with risk. Some of the common arguments "for" and "against" sedentarization are the following:

#### ADVANTAGES OF SEDENTARIZATION

- safety in case of raids;
- access to health care facilities;
- access to primary schools (children's education);
- access to consumer goods;
- easier access to water (time savings for women);
- opportunity to grow crops (if settled on an irrigation scheme);
- diversification of household economic base/risk spreading;
- greater opportunities for earning cash.

#### DISADVANTAGES OF SEDENTARIZATION

- higher dependency on grains as basic food staple;
- greater market dependency (especially if the household cannot grow its own food);
- greater need for cash to buy consumer goods;
- terms of exchange (goats/grain) strongly against pastoralists;
- poor diet, insufficient food: higher incidence of malnutrition than among pastoralists;
- chronic dependency on food aid;



- rapid deforestation of areas around settlements due to higher per capita wood consumption requirements (for cooking grains and for permanent housing);
- concentration of herds around settlement or permanent water point leads to overgrazing local area;

77. In the 70s, in the wake of the Sahel drought, international donors assumed that pastoralists living in famine relief camps should be encouraged to give up herding and become full-time farmers. This was naive. From the experience we learned - that sedentarization is not an all or nothing process, and it is not incompatible with continuation of pastoralism. While commitment to farming may be irreversible, herding remains dominant; social relationships continue to be expressed in terms of herd ownership; profits from agriculture and non-farm activities are invested in animals.

78. The original assumption was that the whole family would become sedentary. We now know that sedentarization usually does not involve the whole household, but only its more vulnerable members (wives of childbearing age, children too young to follow the herds, old or disabled persons); other household members continue to move with the herds. Although households may be split for much of the year, economic transfers between the two parts of the household are crucial for the survival of its members; men and youths living in the bush count on the food grown by the women who remain behind; the women count on receiving goats from the men to exchange for consumer goods.

79. Households on Katilu scheme view irrigated agriculture as a relatively less risky way of growing the grain needed to make up their food deficit than growing rainfed sorghum. In addition to irrigated farming, most sedentarized households on Katilu scheme also keep animals around the scheme, cultivate rainfed sorghum plots and engage in non-farm income earning activities; there is no need to make plots so large that they could derive 100% of their subsistence from irrigated crops, but the grain consumption needs of household members living with the herds need to be considered.

80. The ASAL programme's objective should be to create conditions where pastoralists have a choice. If sedentarization of all or part of the family fits with households' risk spreading strategies, they should be encouraged to continue it. If many of the poorest households, who have become sedentarized against their will (due to loss of herds) prefer to resume herding, it should assist them to build-up their capital so they can reinvest in animals.

C. Implications of Socio-Economic Differentiation: Priority Target Groups and Priority Components for an ASAL Programme

81. All three categories of households - mixed farmers on marginal land, pastoralists with limited agriculture and pure pastoralists - are urgently in need of support. Within each of these groups, access and control over income-producing assets is skewed, and those who need help most are the middle and especially the lower income households. Intervention should be aimed at reversing the trend toward impoverishment. Targetting can be achieved by selecting the activities which would benefit the poor most.

### Mixed Farming Areas

82. Crop failure is the key event in the system, which leads to impoverishment of resource-poor households and accumulation of wealth by households with assets to fall back on. There are four possible strategies for intervening in the existing system: one focusses on water, one on crops, one on livestock and one on off-farm activities.

- increasing the proximity of water to release women's time constraints during the critical period at the onset of the rains when water fetching conflicts with land preparation and planting;
- reducing the risk of crop failure, so that households will not have to sell-off their assets to buy grain;
- increasing livestock numbers, so that households will have more to sell to buy food in bad years; or, improving bargaining power, to enable households to get more money for each animal sold;
- increasing off-farm income, so that households can pay cash for food in bad years and avoid having to sell-off their assets.

83. Reducing risk of crop failure would not increase earnings but it would reduce expenditure (including distress sales of assets), thereby reducing part of the need for livestock and off-farm earnings. Increasing off-farm income of low and middle income households would not reduce food expenditure in bad years but it would enable households to avoid selling off their assets; it would also reduce some of the pressure on land. Both are viable strategies and ought to be pursued. The third strategy (increasing livestock number) can be ruled out on environmental grounds. The fourth strategy (improving bargaining power through intervention in marketing) has been tried with little success.

84. While intervention in a single sector (e.g. rainfed agriculture) might seem attractive from the standpoint of programme implementation, in real life, self-provisioning crop production, livestock, off-farm earnings and water supply are bound up in an integrated system, whose constraints cannot be addressed by intervening in one sector alone. While improvement of food security is a high priority for food deficit households, it does not solve the problem of access to cash. Once a household's subsistence crop needs are met, the incentive to invest in crop production depends on how the returns (and risks) compare with livestock and off-farm activities. Although food security should be a priority, a strong case can be made for supporting livestock and non-farm activities to address household's need for cash.

### Pastoral Systems

85. The key element in the system is market dependency during the dry season: households which do not have to sell off many animals to get grain during the dry season are able to conserve their herds; those in a position to exchange surplus grain for animals accumulate wealth; those with no way of growing their own grain and no other cash income are forced to sell off their animals and become impoverished. Possible strategies for intervening in the system include:

- enabling a larger share of pastoral households to grow some if not all the grain they need;

- enabling poor households to build-up herd numbers to the point where the need for dry season grain consumption is reduced;
- improving bargaining power, so that households will not need to exchange so many animals to buy grain;
- reducing the fall in milk production during the dry season (by improving fodder availability, etc.);
- increasing off-farm earnings of the poor, to enable them to buy grain without having to sell their animals.

86. While the second strategy (building up herds) may still be ecologically (and economically) viable in some geographic areas, it will not be viable in the long run (as population expands). The rapid spontaneous expansion of farming among pastoralists (Little, Perlov, Campbell, Mwaniki) suggests that assistance for types of crop production undertaken by the poor should be a priority. Instead of pursuing a single type of intervention, a strong case can be made for simultaneously supporting efforts to increase off-farm earnings and reduce the drop in milk production.

#### IV. LOCAL PRIORITIES: IMPLICATIONS FOR ASAL PROJECTS

87. Experience of ongoing ASAL projects points overwhelmingly to a conclusion: the spread of innovations is directly correlated with the "fit" or lack of fit with beneficiaries' own priorities. Activities which address a strong felt need; (a) are much more successful in mobilizing local resources; (b) spread to wider numbers of people; and (c) have greater sustainability. Activities and innovations which respond to other people's priorities rather than the intended direct beneficiaries' priorities: (a) fail to mobilize local resources; (b) are not taken up; and (c) do not prove sustainable (see Annex 1).

##### A. Water Supply

88. Water for domestic use and livestock is people's first priority in ASAL areas (apart from clinics, schools and roads). Projects in Machakos and Kitui have taken advantage of its high emotive value to mobilize self-help labour for the construction and rehabilitation of water points. The main source of labour for construction is mwethya groups (80% female). On small water projects, the women who supply the construction labour are the same ones who ultimately benefit from time savings. This explains women's strong incentive to contribute labour, materials and even cash, to maintain and repair the source. The Kitui project has also used the promise of water as a carrot to get local people to contribute labour for terracing and tree planting on communal land around water points (see below).

89. A socio-economic survey revealed that women's first priority regarding water sources is proximity; the closer the source, the greater the time savings. The second priority is reliability. Water quantity is much more important to women than water quality. Of all factors, user fees were the least important to women.

## B. Resource Conservation

90. Experience from ASAL projects suggests that people's main motive for making fanya juu terraces is to make better use of moisture for their crops. Preservation of the soil, in itself, has relatively little emotive value. This factor explains why it has been easy to mobilize self help groups to construct terraces on their own farms and difficult to mobilize self-help labour for off-farm conservation works (such as gully control, afforestation and soil conservation on rangeland).

91. The Kitui ASAL project has successfully mobilized self-help labour for off-farm conservation around water points by making this a precondition for assisting the group to get water. Another strategy has been to demonstrate that by terracing a whole catchment, groups can make the stream at the bottom start to flow again. By linking something which is relatively low on people's priorities (conservation) with something having a high priority (water, or higher yields), conservation becomes more attractive.

92. Where food for work or paid labour have been used to get people to undertake soil conservation and afforestation works which have no immediate, tangible benefits to the people supplying the labour, the works are seldom maintained.

## C. Irrigation

93. The experience of the Katilu irrigation scheme illustrates how lack of fit between planners priorities and people's priorities can undermine a scheme's viability. The initial assumption of the FAO project was that settlers would give up pastoralism and become full-time farmers. So they made plots big enough to provide 100% of the family's subsistence (in theory: if target yields and prices had actually been achieved). And they imposed cotton as a cash crop to ensure settlers a source of cash.

94. But the Turkana saw irrigation farming as a secondary activity (a way of getting a more secure source of supplementary food); their first priority was still to build-up their herds. Because male labour was involved in herding, women found the irrigated plots difficult to handle with available labour. The plots were simultaneously too large (for the labour supply) and too small (in terms of the income produced) to enable them to survive without recourse to complementary activities such as herding, growing rainfed sorghum, gathering wild foods and non-farm production (Brown; Broach-Due; Talks). Women neglected cotton (which had a low priority for them) to allocate as much labour as possible to off-scheme sorghum plots (Brown; Broach-Due; Talks). FAO case studies of small scale irrigation show that schemes are much more viable and sustainable when planners adjust the crop mix and the size of plot to fit the priorities of the direct cultivators and involve them in its management (see Annex 7).

#### D. Livestock and Range Management

95. The experience of the World Bank/USAID projects Livestock I & II illustrates how lack of fit between the project strategy and pastoral peoples' survival strategy led to rejection of proposed innovations and failure to achieve goals. The project strategy, which aimed at maximizing the quantity of beef produced per hectare, was incompatible with local people's strategy of maximizing a continuous supply of milk for human consumption and maintenance of the local population. Likewise, the production unit selected for promotion (group ranches) did not fit well with indigenous production structures (Dyson-Hudson; also see Annex 8).

#### E. Dryland Farming

96. One of the weakest aspects of dryland farming components under existing ASAL projects has been lack of feedback about whether innovations such as water harvesting, drought resistant varieties and improved tillage equipment fit the priorities of the intended beneficiaries. Some experts argue that efforts to introduce spate irrigation will never work among the Turkana because it doesn't fit their culture: spate irrigation requires complex organization to mobilize labour to build/maintain structures and allocate water; the Turkana lack this organization and have no prior experience with manipulating water supply for crops. They argue that water harvesting fits better with Turkana culture (Finkel). However, there is strong evidence from other districts (Samuru, Rendille, Baringo) that pastoralists have adapted rapidly to the requirements of farming and in Njemps have developed the necessary organization to manage irrigation (Little).

97. Although water harvesting structures such as trapezoidal bunds were expected to fit the culture better, now that the Turkana Rehabilitation Project has built them, beneficiaries rarely use them. Because the Turkana are pastoralists, one expert argues that the structures should be designed for growing fodder, in order to fit the culture (Finkel). However, women's increasing investment of time and money in rainfed sorghum plots suggests that this could be a higher priority. Abstract speculation about what "fits" or doesn't fit a particular culture is not a solution: what is called for is direct feedback from the intended beneficiaries.

98. The same argument holds for tie-ridge run off-harvesting techniques. There is evidence that farmers perceive the wide spacing of rows as "a waste of land". And they perceive land preparation as "too labour intensive." The reasons for the apparent lack of interest in millet and sorghum relative to maize need to be investigated. Acceptability of high yielding, short duration varieties of millets, sorghum and pulses and their "fit" or lack of fit with existing patterns of intercropping needs to be ascertained (see Annex 9).

#### F. Income-Generating Activities

99. Experience shows that projects which address the constraints for expansion of existing non-farm activities are more successful than those which introduce new activities on top of women's pre-existing workload. The experience of RDF projects also suggests that centralized group production facilities for goat raising and poultry do not fit with women's own priorities, because groups break down production into individual units.

#### V. EXISTING INSTITUTIONS AND DELIVERY SYSTEMS: APPROPRIATENESS FOR THE TARGET GROUP

100. This section examines existing institutional arrangements for delivering services throughout ASAL areas from the standpoint of their appropriateness to the target group. Its purpose is to identify what needs to be done to ensure that the maximum number of people in priority target groups has access to extension and supporting services.

##### A. Agricultural Extension

101. Agricultural extension poses problems for the ASAL programme, because part of the ASAL districts are covered by the Training and Visit System under the National Extension Project, while other districts are wholly or partly outside it. This means, in essence, that two categories of households are covered (those practicing dryland farming in agro-ecological zone IV and those cultivating plots on MOA-assisted irrigation schemes), while the rest of the target group is outside the T&V system. Extension poses further complications because: (a) the technical packages appropriate for zone IV are not appropriate for zones V-VII, and (b) the low population density, wide dispersion of settlements, poor communications and seasonal herd movements make the logistics more difficult.

##### Extension under the T & V system: the experience in marginal mixed farming zones

102. One of the issues raised in Annex 9 (Agriculture), regards the future of areas already receiving extension under the National Extension Project: should these areas be included or excluded from the ASAL development programme? To shed light on this issue, some of the implications of their inclusion versus exclusion are examined. The main arguments in favour of excluding areas served by T&V are that: (a) they are already receiving assistance from other sources, (b) the areas not served by T&V have different technical and logistical problems and (c) the complication of supporting two types of extension service in a single programme should be avoided. The main arguments in favour of including them are: (a) that GOK defined these areas to be ASAL areas in 1979, (b) that T&V is currently supported by ASAL projects in some districts, (c) that what T&V is doing is beneficial, and (d) that it would be politically unwise to cut these densely populated areas out of the programme at this late date.

103. In actuality, the situation is more complicated. The T&V system currently operates in several ASAL districts, but only two of the 11 ASAL projects (MIDP; EMI phase II) provide funding for T&V. Furthermore, the boundaries of areas included and excluded from T&V vary greatly between districts. In Machakos, where the EEC project funds the district's

agricultural extension programme, the T&V system covers the ASAL parts of the district and excludes the high and medium potential zones. In Embu and Meru, where the ODA will fund agricultural extension in Phase II, the existing boundaries of areas covered by the T&V system do not coincide with the project area (which covers agro-ecological zones IV and V and excludes I-III as well as VI). In Kitui, where the ASAL project covers the whole district but does not fund T&V, T&V is not limited to zone IV, but also covers agro-ecological zones V-VI in Eastern Division. Under present circumstances, there can be no rational basis for excluding zones covered by T&V from the ASAL programme, but this does not imply that donor projects must necessarily fund T&V. Clear policy guidelines are urgently needed.

104. The next issue regards whether the T&V system, as presently implemented, gives adequate attention to the priority target group. Experience from Eastern Province is used to shed light on this question. As noted above, in Machakos, Kitui and Embu, 60% of the farms are managed by women. The basic questions are: (a) to what extent is the system reaching the average farmer, and female farmers in particular? (b) to what extent are extension messages appropriate to the average farmer?

105. In Eastern Province, when the system was initially introduced, contact between extension workers and farmers was organized on the classic T&V model: in each sublocation, a series of "contact" farmers and "follow-up" farmers were selected; contacts between front line extension workers and farmers took place on the contact farmer's holding; follow-up farmers were supposed to go to the contact farmer's fields to attend the extension meetings. The basic assumption underlying the system is that for each contact farmer who adopts project innovations, ten follow-up farmers will imitate him, and, eventually, hundreds of average farmers will imitate the follow-up farmers.

106. Interviews in Kitui revealed that 15% of the agricultural extension workers in the district are women, but both male and female extension workers concentrate on contact farms where the husband is a full-time farmer. In the local context, these farms are not representative: in an area where 60% of the farms are managed by women, those where men are full-time farmers are a small minority; a farm management survey completed by the ASAL project also revealed that the contact farms are much better endowed with land, labour and cash than the follow-up farmers, and the follow-up farmers are better endowed than the average farmer. The survey also revealed two other things of great importance: (a) that innovations were not spreading, and (b) that 52% of the follow-up farmers did not attend even one T&V demonstration.

107. The aim of the ASAL programme is to develop and diffuse technical packages which can be adopted by the average household. The classic T&V system, by focussing a disproportionate share of the resources on contact farms which have more resources than the average farmer, runs a serious risk of promoting technical innovations which are beyond the means of the IFAD target group. Lack of contact with the average household, and women in particular, eliminates an important source of feedback regarding proposed innovations' local acceptability and farmers' constraints for adopting them.

108. The same pattern found in Kitui is confirmed by a nationwide evaluation. In 70% of the cases, the average number of follow-up farmers actually present for demonstrations on the contact farmer's holding is less than four. Likewise, in 80% of the cases, innovations have been adopted only by the contact farmer and a few of the follow-up farmers. The adoption rate among farmers directly contacted is better for crop production (48%), than for animal production (25%), soil conservation (16%) and home economics

(13%). One reason why follow-up farmers do not attend is that social differences within the community make it awkward for poorer farmers to repeatedly attend demonstrations on wealthier people's farms. Another is that most farmers are too busy on their shamba to walk to someone else's farm.

109. Given the poor turnout of follow-up farmers at T&V demonstrations, the Provincial Agricultural Officer decided that in all districts, indigenous mwethya (self-help) groups would be substituted for an unspecified number of contact farmers. Instead of contacting a single individual and a handful of followers, the extension worker makes direct contact with a group of 25-30 people simultaneously. Because mwethya group members are drawn from all socio-economic groups, and 80% are women, they are much more representative of the average farmer than the contact and follow-up farmers reached by T&V. In Machakos the majority of extension contacts are now with self-help groups. According to the Divisional Agricultural Officer in Mwingi (Kitui), contacting mwethya groups is the most cost-effective and efficient way of reaching the largest number of farmers with the lowest overhead cost. This simple innovation has greatly increased the system's outreach to the target group. GOK should consider extending the model to other ASAL areas.

110. The second question, regarding the appropriateness of extension messages to the target group, is treated in Annex 9. There is evidence that the extension service continues to emphasize Katumani maize even in the driest areas, underemphasizing livestock and drought resistant crops, and ignoring the needs of farms who practice shifting cultivation. GOK should consider whether farmers who live outside the areas suitable for maize should receive a different set of extension messages, and if so, whether beneficiary contact should be organized differently.

#### Extension in the arid areas

111. Outside the areas covered by the National Extension Project, a number of added constraints exist for agricultural extension:

- because population density is much lower and farms are more thinly spread, extension workers would have to travel much farther to reach them, and transport costs would be prohibitively high if fortnightly contacts were adopted;
- the average number of extension workers, per location, is lower; extension staff are anxious to transfer to less remote areas;
- there is less need for fortnightly contact because the main activity, livestock, is more constant throughout the seasons.

112. In the light of these circumstances, two models for extension have been proposed for the ASAL areas: (a) a system where extension workers still go out to make contact with farmers and herders, but (to reduce overhead costs) priority is given to areas with higher population, all contact is with groups, and visits are much less frequent (e.g. twice a year); (b) a system where a multidisciplinary team visits each area once, to announce what services are available through the ASAL programme, and thereafter, people who want the services are expected to come to town on market day and ask for them.



113. The advantage of the second alternative (people who want the services come and ask for them) is that much of the burden of transport costs would be borne by the direct beneficiaries, rather than the government. The disadvantages are that:

- if barazas are used to disseminate information on services, meetings are dominated by government officials and village elders; women sit on the sidelines and do not express their views; youths' point of view is rarely represented;
- if those who want assistance are expected to go to town and ask for it, the system has a built-in bias against disadvantaged groups including people living in areas not served by regular transport, people who cannot afford to pay for their own transportation, and women (whose domestic/childcare responsibilities limit their geographic mobility);
- in the past, when extension workers served work-in clients, the wealthy, progressive farmers were the main beneficiaries;
- it would be much more difficult to get the extension workers out of their offices and into farmers' fields;
- extension would lose much of the efficiency that comes from teaching improved techniques directly on the farmer's own fields or animals;
- activities requiring regular backstopping (e.g. beekeeping or goat projects for women's groups) would be difficult to implement;
- actual cost savings would not be great (the cost of travel to solicit requests for assistance would be eliminated but not the cost of providing on site assistance to implement the request).

114. The first alternative would have less of a bias against disadvantaged groups, and extension workers would be forced to spend more time in the fields. However, contact with disadvantaged groups would be largely up to the extension worker, unless targets could be enforced through monitoring.

#### B. Formal Credit Programmes

115. Issues related to credit delivery in ASAL areas are discussed in Annex 6. Credit has never been a central part of donor-supported ASAL programmes. At the most, projects have provided limited amounts of seasonal credit for members of cotton cooperatives (Turkana, Machakos) or rural artisans affiliated with the Kenya Industrial Estates programme (Machakos). Existing delivery systems do not reach the priority target group. Borrowers tend to be those with urban remittances or regular income from civil service jobs and commercial enterprises. Most of the agricultural loans are used to buy additional land rather than to invest in production. Production projects supported by RDF, the Women's Bureau and most NGO's do not use credit; beneficiaries are required to raise approximately 25% of the cost up front before the project will assist them, but the assistance is provided on a grant basis.

116. If credit were to be included as an integral part of the ASAL programme, existing credit institutions would need to be reoriented to the target group. Existing collateral requirements would have to be waived; legal problems associated with using registered self-help groups and women's groups as a receiving mechanism would have to be resolved; group liability could then be introduced. A guarantee fund would have to be established to increase banks' incentives to take risks; mobile credit windows would have to be opened on market day in small centres; institutional backstopping capacity would have to be improved.

#### C. Cooperatives

117. Although two of the ASAL projects have provided limited support for cooperatives (Machakos; Turkana), the consensus is that formal cooperatives are not an appropriate vehicle for reaching the priority target group in most districts. There are too few of them and their membership is skewed in favour of the wealthy. On Katilu irrigation scheme, the interests of the cotton cooperative did not coincide with those of the farmers, and it was necessary to phase out support for the cooperative to allow the farmers to manage their own affairs.

#### D. Indigenous Institutions: Self-Help Groups, Women's Groups

118. Experience suggests that indigenous institutions such as self-help groups and women's groups have a key role to play in the future ASAL programme. The experience of ASAL projects in Kitui and Machakos is discussed in detail in Annex 1 under the heading of "grassroots receiving mechanisms". Activities implemented through self-help groups have been less expensive to construct, operate, maintain; they tend to be self-sustaining at little or no cost to the government.

119. It is often asserted that Akamba social institutions are unique and that the experience of Kitui and Machakos is not generalizable to other ASAL districts. Table 12 shows the ranking of all districts in Kenya, according to the amount of harambee contribution mobilized, and overall wealth. The 8 districts with the lowest self-help contribution are all ASAL districts. The close correlation between wealth and mobilization of self-help is evident. Table 13, shows the number of registered self-help community development efforts. Table 14 presents the same information for registered women's groups. Laikipia district has 145 registered women's groups in spite of the lack of an indigenous tradition (most households are recent settlers from other districts who did not know one another).

120. In spite of the evidence about self-help groups, the ethnographic literature suggests that in nearly all ethnic groups and socio-economic settings, forms of indigenous inter-household cooperation and exchange labour already exist which would be suitable grassroots receiving mechanisms for ASAL programme inputs. In all the areas where traditional irrigation is practiced (Kerio Valley, West Pokot, Njemps Flats, Lorian Swamp, Lower Tana River), forms of cooperation exist which could be harnessed for irrigation rehabilitation and agriculture. Among pastoralists, there is evidence of several different forms of cooperation on different levels of organization for different types of activities (for cooperative herding among the Samburu, see Sperling; for a discussion of other levels of organization, see Dyson-Hudson).

## VI. IMPLICATIONS FOR THE ASAL PROGRAMME

### A. Prioritization of Target Groups

121. All three categories of households -- mixed farmers on marginal lands, pastoralists who engage in agriculture on a limited basis, and pure pastoralists -- are urgently in need of assistance. Within each of these categories, resources are highly skewed, and those who need help most are the middle and especially the lower income households.

### B. Prioritization of Programme Components

122. Although one category of the target group is crop based while the other two are livestock based, in all three cases, food security is the first priority. In some areas, the best way to improve food security is to reduce the risk of crop failure. In other areas, food security can be improved by expanding non-farm activities or reducing the drop in milk production during the dry season. Although intervention in a single sector might seem appealing from the standpoint of implementation, a multi-pronged approach focussed on water supply, dryland farming, livestock/range improvement and off-farm income-generating activities fits better with local people's own strategies for coping with risk through diversification of income sources.

### C. Mobilization of Local Resources

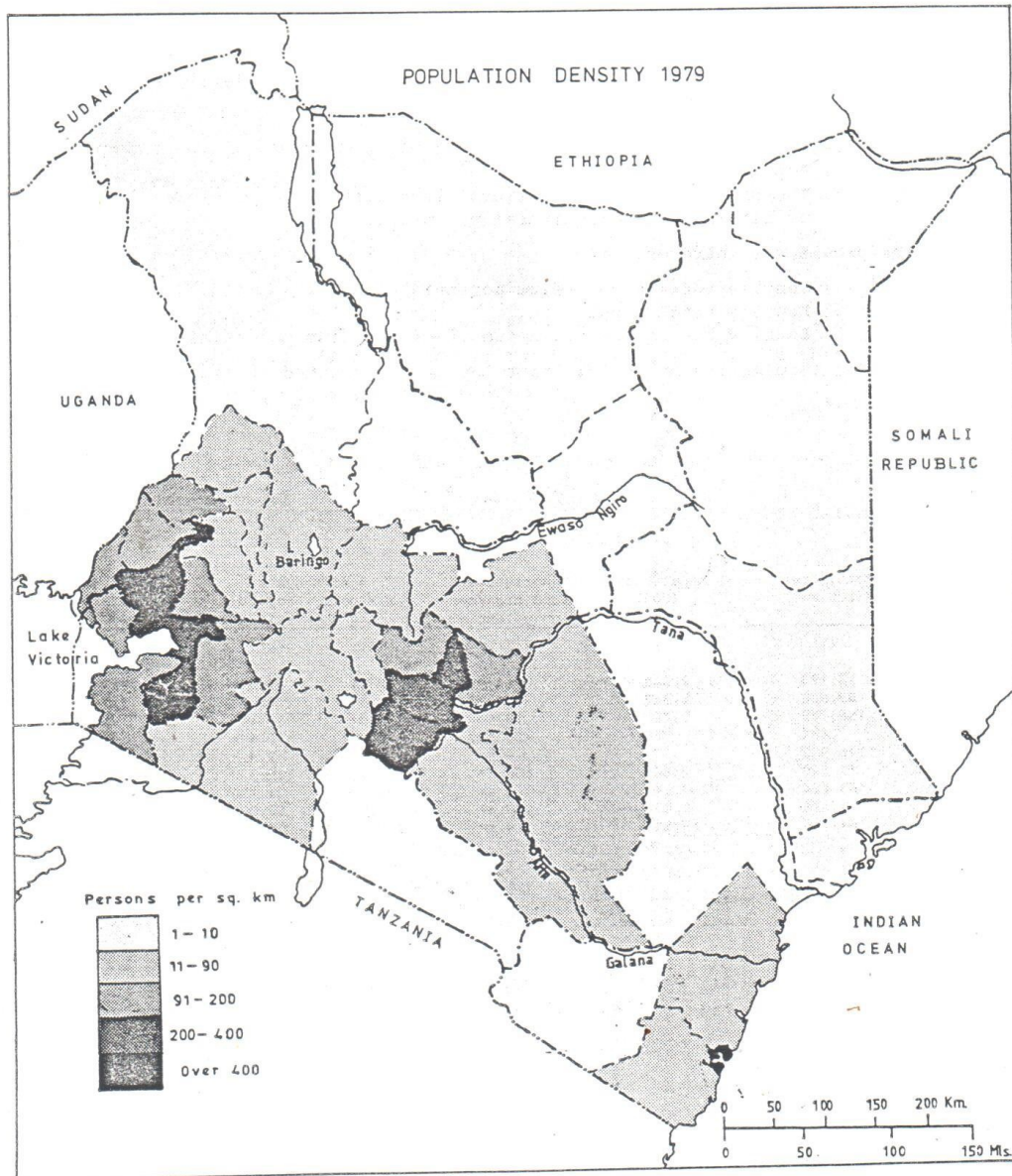
123. Mobilization of local resources (self-help labour, materials, savings) has an important role to play in the development of the ASAL areas. There is a strong correlation between beneficiary commitment to projects and the level of self-help contribution in the construction, operation and maintenance of services. Beneficiary commitment, in turn, depends on the fit or lack of fit between proposed innovations and local priorities. Because this factor is so important, a strong case can be made for strengthening the Community Development section of the Ministry of Culture and Social Services to assist in mobilizing beneficiary groups for activities undertaken by MOA, MOWD and MLD. In addition, it would be useful to have a socio-economist or economic anthropologist assigned to the ASAL planning team, to take the responsibility for soliciting and analyzing beneficiary reactions.

### D. Adaptation of Delivery Systems

124. Because of ASAL areas' special constraints, delivery of extension, credit and supporting services needs rethinking: (a) to make them cost-effective and (b) to ensure adequate outreach to the target group. Since existing experience suggests that it is more cost-effective to deliver services to beneficiary groups in comparison with individuals, extension services should consider adopting this as a general policy. Since the membership of indigenous self-help groups is much more representative of average farmers than the contact farmers reached by the classic T&V system, a strong case can be made for replicating the experience in other parts of ASAL areas. Credit institutions are urgently in need to reorientation to the

target group, utilizing existing beneficiary groups as a receiving mechanism. Existing people's organizations are more suitable than formal cooperatives.

KENYA  
ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT



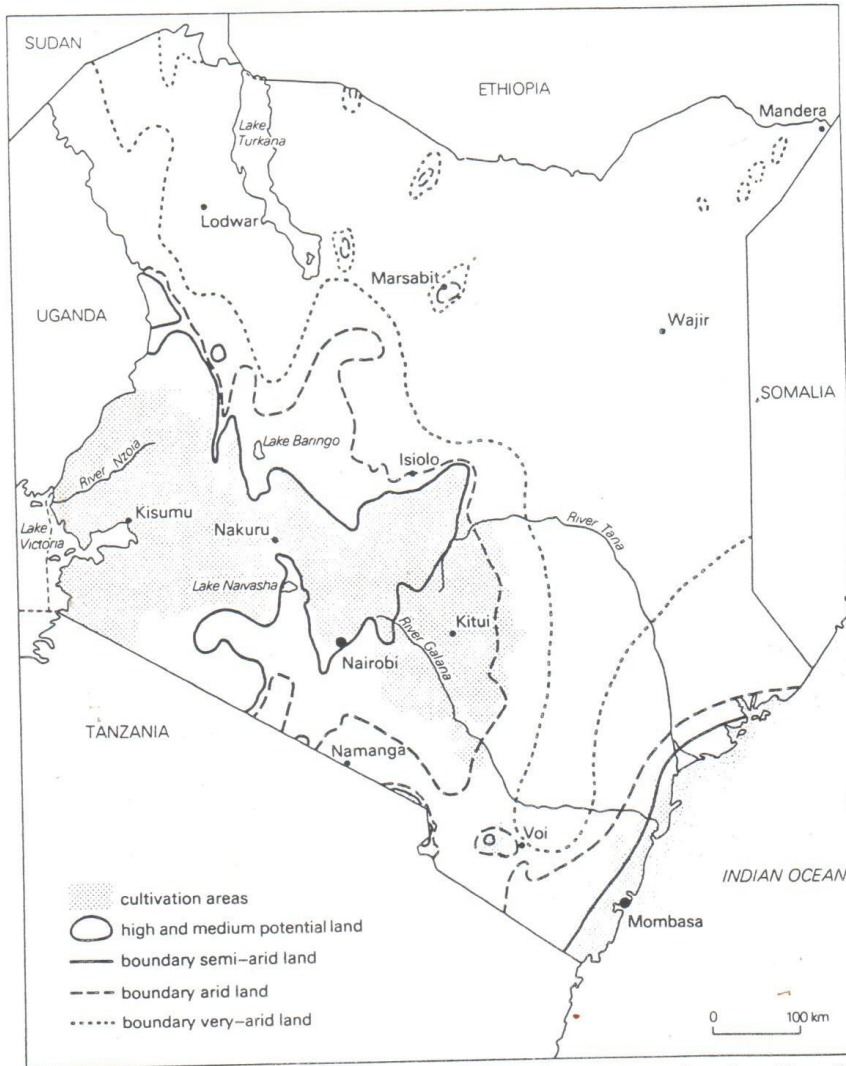
KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ANNEX 2

Map 2

RELATION BETWEEN THE CULTIVATION AREAS AND THE SEMI-ARID AND ARID ZONES, 1982



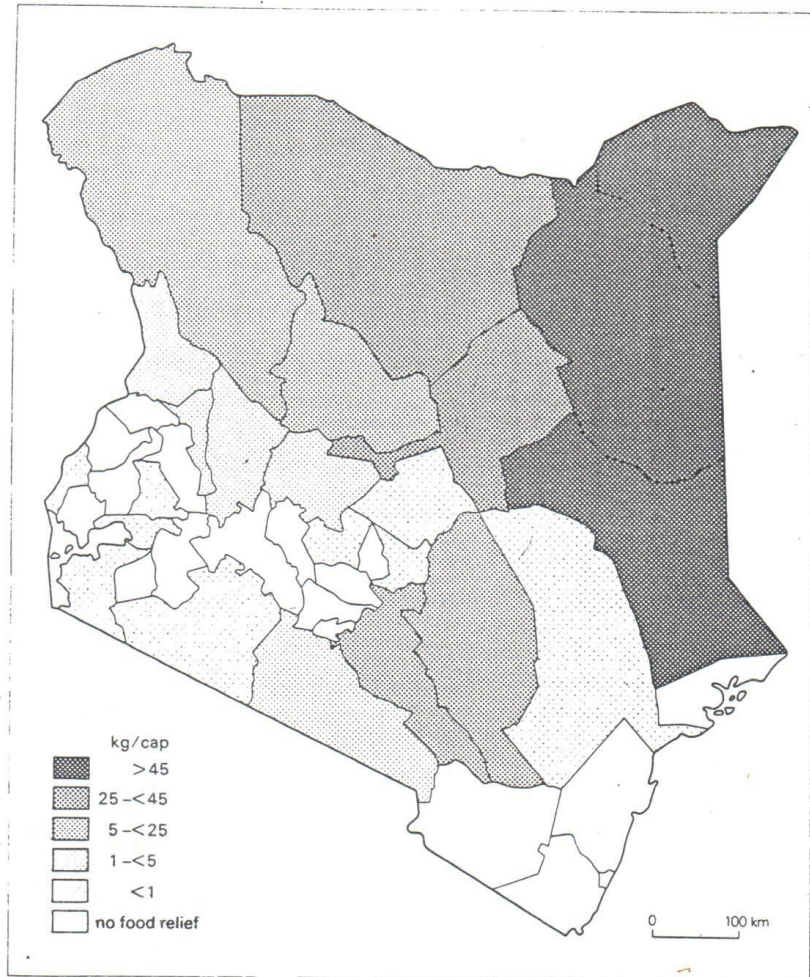
Source: Epp and Kilmayer, 1982

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ANNEX 2  
Map 3

FOOD RELIEF PER CAPITA (KG MAIZE) BY DISTRICT, 1973-1983



Source: Food Relief Department, Office of the President

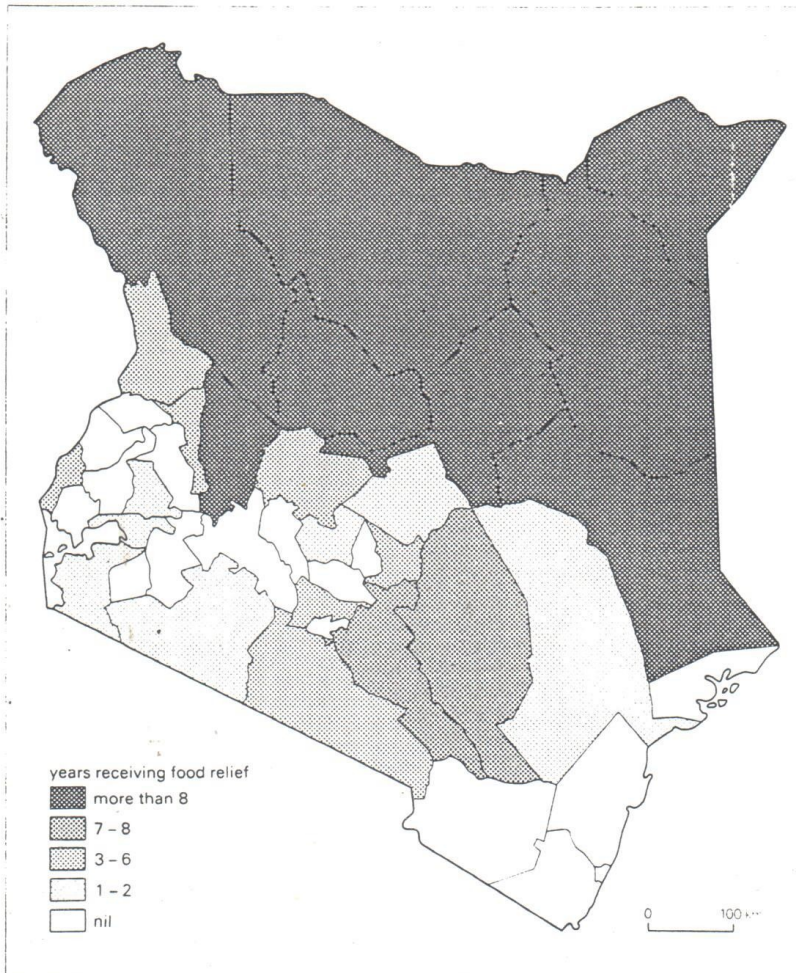
KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ANNEX 2

Map 4

DISTRICTS RECEIVING FOOD RELIEF IN PERIOD 1973-1983



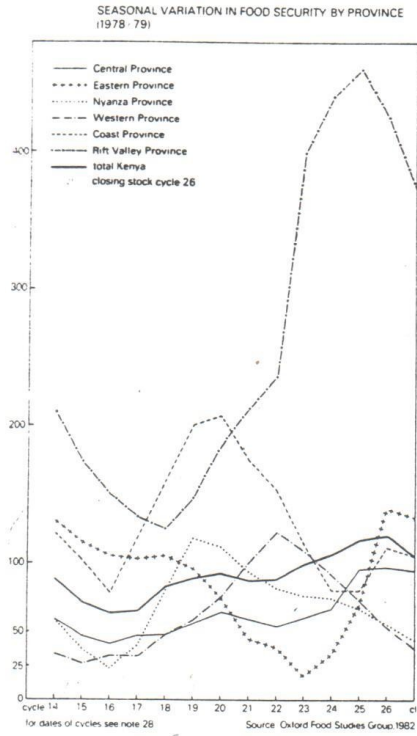
Source: Food Relief Department Office of the President



KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ANNEX 2  
Figure 1



KENYA  
ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

SEASONAL ASPECTS OF FARM HOUSEHOLD LABOUR ALLOCATION - KITUI DISTRICT

CROPS	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Katamani maize	HARVEST		PLOUGH/PLANT	WEED	HARVEST					PLOUGH/ PLANT		WEED
Sorghum/ millets	BIRD HARVEST SCARING		PLOUGH/ PLANT	WEED	BIRD HARVEST SCARING					PLOUGH/ PLANT		WEED
Pigeon peas					HARVEST					PLOUGH/ PLANT		WEED
Cowpeas	HARVEST		PLOUGH/PLANT/WEED		HARVEST					PLOUGH/PLANT		WEED
Green grams	HARVEST		PLOUGH/ PLANT	WEED	HARVEST					PLOUGH/PLANT		WEED
Cassava						HARVEST				PLOUGH/PLANT		WEED
Cotton					HARVEST					PLOUGH/PLANT		WEED

WATER  
FETCHING

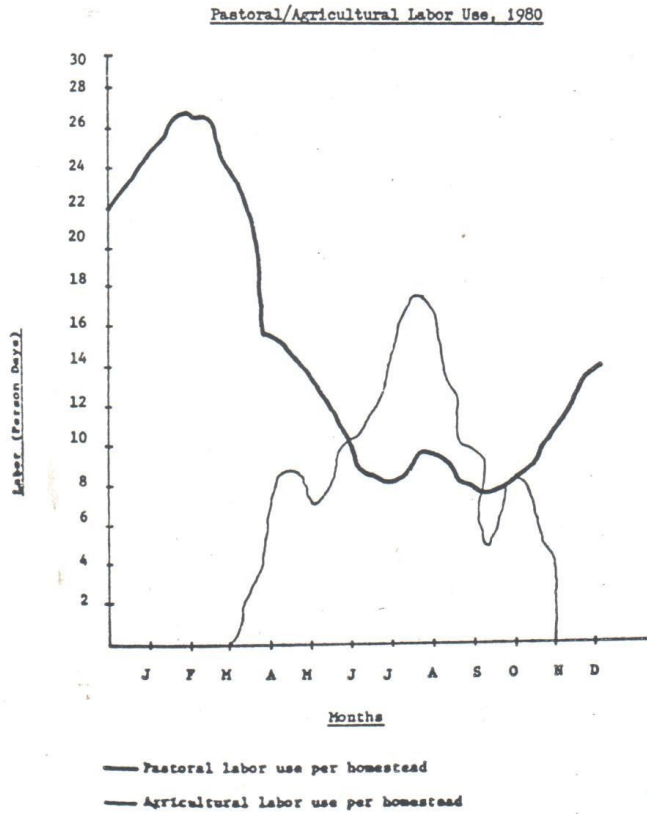
MWETHYA  
GROUP  
LABOUR

PEAK: LONG TREKS TO DRY SEASON SOURCES

LONG DRY SEASON CAMPAIGN

KENYA  
ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ANNEX 2  
Figure 3



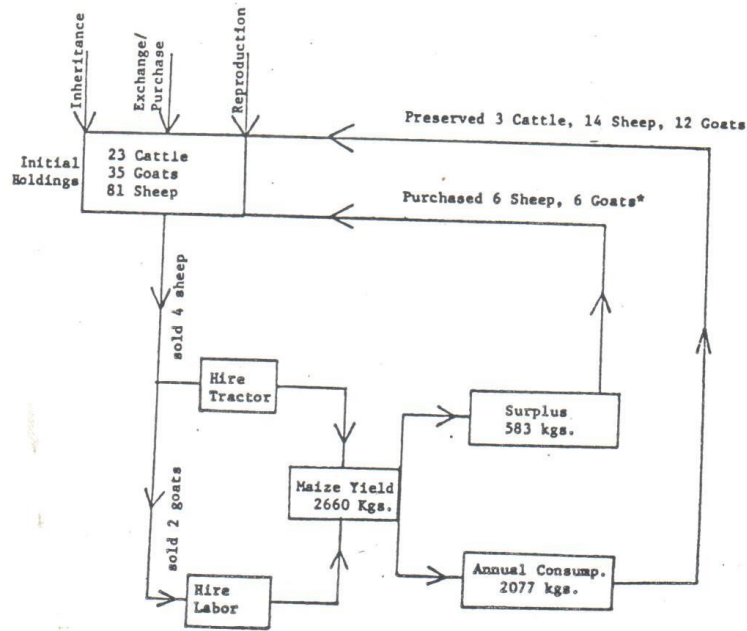
Source: Peter Little (1984)

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ANNEX 2  
Figure 4

An Investment Model of an Agro-Pastoral  
Enterprise: 1980-1981



\* More stock could have been purchased, but the owner gave eighty kilograms of grain to relatives.

Source: Peter Little (84)

## KENYA

## ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

## Area Population and Density by Province and District 1969 and 1979

Province and District	Area		Population 1969		Population 1969		Density	
	sq. km	%	Number	%	Number	%	1969	1979
Embu	2,714	0.5	178,912	1.6	263,173	1.7	62	96
Isiolo	25,605	4.5	30,135	0.3	43,478	0.3	1	1
Kitui	29,388	5.2	342,953	3.1	464,283	3.0	11	15
Machakos	14,178	2.5	707,214	6.5	1,022,522	6.7	50	72
Marsabit	73,952	13.1	51,581	0.5	96,216	0.6	1	1
Meru	9,922	1.8	586,506	5.5	830,179	5.4	63	83
Eastern Province	155,759	27.8	1,907,301	17.4	2,719,851	17.7	12	17
Garissa	43,931	7.8	64,521	0.6	128,867	0.8	2	3
Mandera	26,470	4.7	95,006	0.9	105,609	0.7	1	3
Wajir	56,501	10.0	86,230	0.8	139,319	0.9	4	2
Northeastern Province	126,902	22.5	245,757	2.2	373,787	2.4	2	2
Kilifi	12,414	2.2	307,568	2.8	430,986	2.8	24	34
Kwale	8,257	1.5	205,602	1.9	288,363	1.9	25	34
Lamu	6,506	1.2	22,401	0.2	42,299	0.3	4	6
Mombasa	210	-	247,073	2.3	341,148	2.2	1,155	1,622
Taita/Taveta	16,959	3.0	110,742	1.0	147,597	1.0	6	8
Tana River	38,694	6.9	50,696	0.5	92,401	0.6	1	2
Coast Province	83,040	14.7	944,082	8.6	1,342,794	8.8	11	16
Baringo	9,885	1.8	161,741	1.5	203,793	1.3	15	20
Elgeyo/Marakwet	2,279	0.4	159,265	1.5	148,868	1.0	57	65
Kajiado	19,605	3.5	85,903	0.8	149,005	1.0	4	7
Laikipia	9,718	1.7	66,506	0.6	134,524	0.9	7	13
Narok	16,115	2.9	125,219	1.1	210,306	1.4	7	13
Samuru	17,521	3.1	69,519	0.6	76,908	0.5	3	4
Turkana	61,768	10.9	165,225	1.5	142,702	0.9	2	2
W. Pokot	9,090	1.6	82,458	0.8	158,652	1.0	16	17
Rift Valley Province	163,883	29.0	2,210,289	20.2	3,240,402	21.1	12	19
Total Kenya	564,162	100.0	10,942,705	100.0	15,327,061	100.0	19	27

KENYA  
ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Provincial and District Intercensal (1969-1979) and Projected (1980-1990)  
Annual Population Growth Rates

Province/District	Average Annual Growth Rates	
	Intercensal (1969-1979)	Projected (1980-1990)
NAIROBI	4.982	5.172
CENTRAL	3.42	3.85
Kiambu	3.74	4.88
Kirinyaga	2.99	3.65
Merang'a	3.83	4.85
Nyandarua	2.88	3.55
Nyeri	3.83	3.65
COAST	3.59	4.81
Kilifi	3.43	3.92
Kwale	3.44	3.94
Lamu	4.56	5.15
Mombasa	3.28	3.86
Taita	2.91	3.67
Tana River	4.19	5.87
EASTERN	3.61	4.84
Embu	3.93	4.18
Isiolo	3.73	3.98
Kitui	3.88	3.76
Machakos	3.76	4.11
Marsabit	4.43	5.28
Meru	3.36	3.91
NORTHEASTERN	4.28	4.68
Garissa	7.16	5.73
Mandera	1.86	2.51
Majir	4.91	4.88
NYANZA	2.22	3.46
Kisii	2.56	3.63
Kisumu	1.87	3.28
Siaya	2.16	3.42
S. Nyanza	2.12	3.41
RIFT VALLEY	3.84	4.31
Baringo	2.34	3.47
Elgeyo/Marakwet	-8.63	8.86
Kajiado	5.66	5.86
Kericho	2.83	3.74
Lakipia	7.38	5.55
Makere	6.84	5.18
Mandi	3.65	4.19
Marak	5.32	4.94
Samburu	1.82	2.58
Trans Nziya	7.63	5.67
Turkana	-1.29	-8.24
Uasin Gishu	4.64	4.65
W. Pate	5.11	5.48
WESTERN	3.27	3.78
Bungoma	3.85	3.98
Busia	4.84	4.83
Kakamega	2.79	3.46

Source: ROK, 1979 Population Census, Compendium to Volume I.  
Based on 1969 enumeration, corrected for undercounting and an  
1979 enumeration uncorrected.

ROK, Population Projections 1980-2000.  
Projections assumed no change from the fertility and mortality  
levels estimated from the 1979 census.

ANNEX 2  
Table 3

KENYA

ANNEX 2 SEMI-ARID LANDS (SAL) DEVELOPMENT

Migration in Kenya (Nearest 1,000)

Province/District	Net Migration	Migrants as percent of total population		Sex ratio of Migrants	
		In	Out	In	Out
<b>NAIROBI</b>	+430,000	602	112	1.58	1.01
<b>CENTRAL</b>	-280,000	15	27	1.10	1.13
Kiambu	-117,000	16	33	1.33	1.03
Kirinyaga	+ 189	10	10	1.19	1.29
Marang'a	-113,000	11	28	1.01	1.24
Myeriyaga	-100,000	9	32	1.05	1.16
Nyandarua	+ 50,000	32	12	0.95	0.94
<b>COAST</b>	+146,000	22	11	1.39	1.27
Kilifi	- 8,000	6	9	1.21	1.65
Kwale	+ 8,000	12	9	1.17	1.24
Lamu	+ 4,000	29	20	1.31	1.10
Mombasa	+149,000	55	11	1.57	1.06
Taita/Taveta	- 10,000	15	22	1.46	1.24
Tana River	+ 5,000	14	9	1.36	1.31
<b>EASTERN</b>	-179,000	7	11	1.25	1.62
Embu	- 77	9	9	1.07	1.41
Isiolo	- 2,000	24	20	1.42	1.36
Kisumu	- 52,000	4	15	1.00	1.95
Machakos	-111,000	4	15	1.40	1.54
Marsabit	- 2,000	10	12	1.29	1.47
Meru	- 12,000	3	4	1.32	1.75
<b>NORTHEASTERN</b>	- 15,000	12	16	1.22	1.17
Carissa	+ 5,000	11	7	1.34	1.29
Mandera	- 27,000	4	29	1.66	1.12
Majir	+ 6,000	18	14	1.10	1.22
<b>NYANZA</b>	-312,000	8	20	0.75	1.14
Kisii	- 61,000	2	9	1.06	1.58
Kisumu	- 26,000	21	27	0.88	0.98
Siaya	-139,000	8	38	0.55	1.14
S. Nyanza	- 86,000	7	17	0.62	1.11
<b>RIFT VALLEY</b>	+365,000	28	15	1.16	1.00
Kajiado	+ 26,000	25	2	1.10	1.45
Kericho	+ 4,000	14	13	1.46	1.11
Laikipia	+ 57,000	56	13	1.14	1.05
Nakuru	+191,000	50	13	1.15	1.02
Nandi	+ 9,000	26	23	1.18	0.98
Marak	+ 29,000	20	6	1.08	1.30
Baringo	- 15,000	7	14	1.31	1.11
Elgeyo/Marakwet	- 16,000	9	20	1.08	1.05
Sanbu	- 11,000	7	21	1.40	1.30
Trans Nzeia	+ 91,000	45	10	1.05	1.98
Turkana	- 21,000	3	18	2.46	1.38
Uasin Gishu	+110,000	49	10	1.13	0.98
W. Pokot	+ 7,000	9	5	1.15	1.16
<b>WESTERN</b>	-305,000	8	24	0.82	1.21
Bungoma	- 33,000	10	16	0.86	1.01
Busia	- 22,000	11	19	0.66	1.20
Kakamega	-250,000	5	30	0.88	1.27
<b>KENYA</b>	-	17	17	1.197	1.197

Source: Beskok, 1981

## KENYA

## ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

## Lifetime Migration by District

District	Emigrated in District	Born in District	In- Migrants	Out- Migrants	Net Migration
NAIROBI	827,775	303,403	615,942	91,570	+524,373
Kiambu	686,290	794,595	114,599	222,904	-108,305
Kirinyaga	291,431	291,057	29,769	29,395	+ 374
Muranga	648,333	760,679	70,128	182,474	-112,346
Nyandarua	233,302	179,179	93,336	39,213	+ 54,123
Nyeri	486,477	593,201	46,287	153,011	+106,724
Kilifi	430,986	437,860	30,391	37,265	- 6,874
Kwale	288,363	275,961	38,805	26,403	+ 12,402
Lamu	42,299	37,585	13,349	8,635	+ 4,714
Mombasa	341,148	173,269	206,878	38,999	+167,879
Taita/Taveta	147,597	155,356	24,470	32,229	- 7,759
Tana River	92,401	87,490	12,952	8,041	+ 4,911
Embu	263,173	262,965	23,956	23,748	+ 208
Isiolo	43,478	44,997	10,588	12,107	- 1,519
Kitui	464,283	515,837	19,694	71,248	- 51,554
Machakos	1,022,522	1,133,112	44,418	155,008	-110,590
Marsabit	96,216	94,533	13,004	11,321	+ 1,683
Meru	830,179	841,750	24,275	35,846	- 11,571
Garissa	128,867	123,396	14,721	9,150	+ 5,571
Mandera	105,601	131,556	4,890	30,845	- 25,955
Wajir	139,319	131,128	27,250	19,059	+ 8,191
Kisii	869,512	929,980	17,580	78,048	- 60,468
Kisumu	482,327	506,633	108,738	133,044	- 24,306
Siaya	474,516	608,233	44,616	178,333	-133,717
S. Nyanza	817,601	862,280	64,455	109,134	- 44,679
Baringo	203,792	218,474	13,846	28,528	- 14,682
Elgeyo/Marakwet	148,868	164,532	13,535	29,199	- 15,664
Kajiado	149,005	120,166	39,370	10,531	+ 28,839
Kericho	633,348	627,255	89,391	83,298	+ 6,093
Laikipia	134,524	76,581	75,730	17,787	+ 57,943
Nakuru	522,709	327,552	263,415	68,258	+195,157
Nandi	299,319	290,854	80,160	71,695	+ 8,465
Narok	210,306	181,241	42,597	13,532	+ 29,065
Samburu	76,908	87,775	5,363	16,230	- 10,867
Trans-Nzoia	259,503	165,909	121,319	27,725	+ 93,594
Turkana	142,702	163,444	4,413	25,155	- 21,742
Vasin Gishu	300,766	180,212	149,595	29,041	+120,554
W. Pokot	158,652	151,042	15,234	7,624	+ 7,610
Bungoma	503,935	530,628	55,449	82,142	- 26,693
Busia	297,841	310,221	43,936	56,316	- 12,380
Kakamega	1,030,887	1,278,595	59,146	306,854	-247,708



## KENYA

## ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

## Indicators of Nutritional Status and Other Selected Indicators by District

District	Mortality		Malaria Percent of Cases	Percent Children having no Education	Percent without piped water	Percent without sewage facilities	Population Density		Child pop'n. 0-4 yrs (x 1000)	No. Children stunted (x 1000)
	Survey	Census					Sq. km	Persons/ Arable Sq. km		
Kilifi/Tana River/Lamu	42.1	206	64.1	85.8	74.7	64.9	10	70	105a	44
Kwale	38.5	190	43.4	83.0	86.0	81.5	35	100	53	29
Siaya	36.6	211	61.1	51.5	98.1	36.1	187	187	81	30
Nakuru	34.5	97	43.6	54.9	85.8	14.3	74	158	101	35
Kisii	33.1	101	57.7	51.6	99.0	17.4	395	395	180	56
Kitui	30.0	148	10.2	70.9	100.0	72.1	16	39	83	25
Kakamega	26.7	143	56.2	46.2	96.5	16.4	293	293	201	54
S. Nyanza	25.3	216	58.4	56.9	99.5	68.8	143	143	145	37
Murang'a	24.8	68	42.1	28.1	76.2	2.8	262	310	127	31
Rungwa	24.7	140	9.8	35.1	89.3	25.2	164	199	105	25
Kirinyaga	24.5	82	35.3	43.3	77.7	4.1	203	270	53	13
Machakos	23.1	98	46.9	38.3	95.3	36.8	72	114	189	44
Embu	22.3	83	45.0	34.9	89.1	19.3	97	104	51	11
Busia	21.1	198	72.6	88.4	99.3	26.6	183	183	56	12
Narok/Kajiado	19.8	87	4.9	72.6	93.2	79.2	9	39	90b	18
Kisumu	19.8	199	20.0	36.5	87.5	7.8	232	232	86	17
Baringo/Laikipia	19.4	128	47.7	55.4	93.0	41.7	17	89	80c	16
Trans Nzoia	19.1	114	41.8	44.5	86.8	25.3	105	125	53	10
Elgeyo/Marakwet/W.Pokot	18.6	160	49.3	53.8	98.1	54.5	39	149	70d	13
Nyari	18.5	49	3.2	13.4	78.6	0	148	130	87	16
Kericho	18.1	91	7.2	64.8	85.7	66.4	130	167	128	23
Uasin Gishu	17.8	92	9.9	41.6	95.2	48.5	79	92	57	10
Kiambu	17.5	70	30.6	40.1	75.0	0	280	375	125	22
Meru	16.8	75	7.3	43.9	68.4	14.1	84	247	160	27
Taita/Taveta	14.7	116	10.1	40.9	80.5	14.7	9	284	26	4
Nyandarua	12.4	64	5.5	35.2	82.4	2.0	66	88	47	6
Nandi	12.1	110	9.8	46.1	79.6	53.1	109	128	58	7

\* Number of children dying in first 2 years of life per 1,000 based on 1979 census estimates by Mr. Kibet, Population Studies Research Institute, University of Nairobi. As presented by the child mortality in Kenya

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Percentage distribution of Households, by Holding Size, by Province (IRS-2,3,4)

	KENYA																				
	COAST			EASTERN			CENTRAL			RIFT VALLEY			NYANZA			WESTERN			NATIONAL TOTAL		
	IRS-2	IRS-3	IRS-4	IRS-2	IRS-3	IRS-4	IRS-2	IRS-3	IRS-4	IRS-2	IRS-3	IRS-4	IRS-2	IRS-3	IRS-4	IRS-2	IRS-3	IRS-4	IRS-2	IRS-3	IRS-4
0 Hectares	27.0	20.3	29.0	8.9	19.2	19.7	10.3	16.6	21.8	17.6	28.0	36.8	16.6	16.6	15.8	8.2	6.6	8.7	13.7	17.9	21.6
0.01-0.4 Hect.	2.6	13.8	12.4	24.9	20.5	18.4	34.4	29.9	27.6	29.6	24.8	18.1	25.1	29.7	34.6	20.2	24.9	28.0	25.7	25.7	25.2
0.5-0.9 Hect.	13.8	19.5	16.8	18.2	20.1	22.1	18.8	19.7	19.8	20.5	15.3	11.1	23.2	22.7	23.5	24.4	25.3	26.3	20.5	20.5	26.1
1.0-1.9 Hect.	10.0	11.3	17.8	20.9	18.2	21.4	17.7	17.4	14.5	16.3	11.3	9.4	19.7	17.3	14.6	21.5	23.0	21.8	18.5	16.9	15.3
2.0-2.9 Hect.	11.7	9.0	7.2	7.9	6.3	8.9	8.2	6.5	7.6	6.5	7.6	7.6	6.6	6.9	5.9	9.9	9.1	7.3	7.9	7.4	7.3
3.0-3.9 Hect.	13.5	9.4	6.0	4.4	3.5	3.0	4.4	5.0	4.8	1.5	3.6	2.7	2.4	3.0	2.1	8.1	4.9	2.7	4.4	4.2	3.2
4.0-4.9 Hect.	9.6	4.6	2.7	2.2	2.1	1.7	3.7	2.0	1.3	2.4	4.2	3.5	1.9	1.1	0.6	2.6	2.0	0.9	3.0	2.3	1.5
5.0-7.9 Hect.	7.8	7.7	5.8	5.6	4.5	1.4	1.2	1.6	1.6	3.6	2.6	5.9	1.9	1.4	1.1	3.7	3.0	3.3	3.4	2.8	2.8
8.0+ Hect.	4.0	4.4	2.3	7.0	5.6	3.4	1.3	1.0	1.0	2.0	2.6	4.9	2.6	1.3	1.8	1.6	1.2	1.0	2.9	2.4	2.4
	121.5	126.9	160.2	353.0	405.2	455.8	376.8	397.5	501.3	411.9	461.2	526.5	443.0	646.5	708.0	272.7	355.8	341.8	1,978.9	2,395.1	2,693.6

Source: Integrated Rural Survey

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Sexual Division of Labour

Tasks done primarily by Women	Tasks done about equally by Women and Men	Tasks done primarily by Men
Harvesting	Land preparation (coffee zone)	land preparation (cotton zone)
Planting	Milking cows	Taking livestock to dip (weekly)
Threshing	Applying manure to crops	Grazing livestock
Winnowing	Compulsory communal work at cooperative	Taking livestock to river
Fetching firewood	societies and cattle dips	Pruning coffee
Fetching water		
Preparing food		
Tending poultry		
Gathering food for livestock		
Compulsory communal work at schools and churches		

Source: Hagernd 1984; P.09

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Percentage Distribution of Population over 15 Years of Age Working on Selected Crops, Livestock and Other Activities, by Sex

	Coast			Eastern			Central			Rift Valley			Mwanza			Western			National Total					
	P	W	H	P	W	H	P	W	H	P	W	H	P	W	H	P	W	H	P	W	H			
<b>MAIZE</b>																								
<b>Males</b>																								
Works regularly	64.9	67.4	64.9	17.6	46.2	54.6	50.4	42.3	42.3	6.2	59.5	52.2	57.3	35.6	63.7	62.7	56.7	18.5	55.1	51.6	52.7	23.0	54.4	54.7
Works sometimes	9.8	8.6	9.4	3.3	13.9	15.7	15.4	4.0	7.9	12.0	10.3	11.8	9.7	16.2	14.1	13.2	3.0	3.5	5.6	44.7	4.6	6.0	5.6	37.8
Does not work	3.7	2.4	4.1	57.5	15.1	6.9	10.8	39.1	18.4	8.9	9.2	56.7	7.9	11.1	7.7	27.8	3.0	3.5	5.6	44.7	4.6	6.0	5.6	37.8
Not stated	21.6	21.6	21.6	21.6	22.8	22.8	22.8	33.1	33.1	33.1	24.7	24.7	24.7	24.7	24.7	24.7	23.6	23.6	23.6	23.3	23.3	23.3	24.5	24.5
<b>Females</b>																								
Works regularly	84.5	83.7	84.5	18.0	88.1	87.8	88.4	66.7	90.8	91.1	91.1	52.1	79.9	80.0	80.3	43.3	93.1	92.8	93.3	58.1	90.8	90.5	90.8	52.7
Works sometimes	0.4	0.8	0.4	4.1	1.5	1.5	1.5	5.9	2.0	1.6	1.3	1.0	1.8	1.4	1.1	10.1	0.5	0.7	0.5	12.5	2.8	3.5	3.2	10.6
Does not work	0.4	0.8	0.4	63.2	2.5	2.7	2.1	19.4	1.3	1.3	1.6	41.0	4.8	5.1	5.1	33.1	1.6	1.6	1.4	24.5	1.8	1.4	1.4	32.1
Not stated	14.7	14.7	14.7	14.7	7.9	68.0	8.0	8.0	5.9	6.0	6.0	5.9	13.5	13.5	13.5	4.8	4.9	4.8	4.9	4.6	4.6	4.6	4.6	8.9
<b>ENGLISH POTATO</b>																								
<b>Males</b>																								
Works regularly	0.4	0.4	0.4	0.0	4.3	4.7	4.4	2.5	31.1	27.9	28.2	8.2	10.5	10.3	10.1	7.5	3.7	3.7	2.8	0.4	0.0	0.4	0.0	8.0
Works sometimes	0.0	0.0	0.0	0.0	1.8	1.2	1.5	1.5	4.6	6.6	6.2	4.3	1.5	1.7	1.5	0.7	0.5	0.5	0.7	0.4	0.4	0.4	0.4	1.5
<b>Females</b>																								
Works regularly	1.2	1.2	1.2	0.0	7.9	7.7	7.9	5.7	54.4	54.4	54.4	28.2	17.3	17.3	17.6	7.9	3.9	4.2	4.2	0.7	0.7	0.7	0.7	13.4
Works sometimes	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.5	0.7	0.7	0.7	2.6	0.6	0.7	0.6	0.7	0.5	0.5	0.7	0.0	0.0	0.0	0.0	0.4
<b>COFFEE</b>																								
<b>Males</b>																								
Works regularly	0.0	0.0	0.0	0.0	24.8	23.9	22.4	20.4	21.3	21.6	20.0	16.7	0.3	0.3	0.3	0.3	12.7	11.3	12.0	9.5	8.8	7.4	7.8	8.5
Works sometimes	0.0	0.0	0.0	0.0	4.1	5.4	4.7	4.1	2.6	3.0	3.0	3.0	0.1	0.1	0.1	0.1	1.9	3.5	2.8	4.2	1.1	2.1	2.1	1.4
<b>Females</b>																								
Works regularly	0.0	0.0	0.0	0.0	23.2	29.3	28.9	25.3	31.1	35.4	32.1	30.5	0.6	0.6	0.6	0.3	11.8	16.2	15.7	12.7	6.4	10.2	9.9	5.7
Works sometimes	0.0	0.0	0.0	0.0	2.5	3.6	1.6	3.2	0.3	0.0	0.3	0.3	0.0	0.0	0.0	0.0	1.6	2.3	2.8	3.9	0.4	0.7	0.4	1.1

Percentage Distribution of Population over 15 Years of Age Working on Selected Crops, Livestock and Other Activities, by Sex

	Coast			Eastern			Central			Rift Valley			Mwanza			Western			National Total											
	P	W	H	P	W	H	P	W	H	P	W	H	P	W	H	P	W	H	P	W	H									
	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M									
TEA																														
Males																														
Works regularly	0.0	0.0	0.0	0.0	0.0	0.0	3.9	3.8	3.4	3.3	17.0	15.1	12.8	7.5	3.2	3.0	3.4	3.4	8.1	7.4	7.2	5.6	0.4	0.7	1.1	1.1	5.1	4.7	4.5	3.6
Works sometimes	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.6	0.5	1.3	3.9	3.6	5.2	0.6	0.7	0.6	0.4	1.4	2.5	2.3	2.8	0.0	0.4	0.0	0.0	0.6	1.2	1.1	1.3
Females																														
Works regularly	0.0	0.0	0.0	0.0	0.0	0.0	3.2	3.8	3.8	3.7	18.4	23.3	21.6	21.3	3.4	3.2	3.8	3.2	5.8	10.0	10.2	9.5	1.1	1.8	2.1	2.1	4.8	6.2	6.2	5.9
Works sometimes	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	3.6	1.3	1.0	1.0	0.3	0.7	0.3	0.7	3.0	0.7	0.2	0.9	0.0	0.0	0.0	0.0	1.0	0.5	0.2	0.5
PYRETHRUM																														
Males																														
Works regularly	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.1	0.1	5.9	5.2	4.3	3.3	12.1	11.3	10.7	10.8	8.1	8.6	8.6	5.6	0.0	0.0	0.0	0.0	5.1	4.8	4.6	4.0
Works sometimes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	1.0	1.3	1.6	1.0	1.3	1.3	1.4	1.3	1.6	1.6	1.4	2.5	0.0	0.0	0.0	0.0	0.7	0.7	0.8	0.9
Females																														
Works regularly	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.2	0.2	9.2	9.5	8.9	7.9	14.8	15.0	14.1	7.7	11.6	11.6	11.6	11.1	0.0	0.0	0.0	0.0	6.7	6.8	6.4	4.6
Works sometimes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.7	0.7	1.0	0.3	0.3	0.6	1.7	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.6
COTTON																														
Males																														
Works regularly	2.0	2.9	2.4	1.6	9.6	10.2	10.2	9.0	1.3	1.0	1.3	0.7	2.8	2.8	2.7	2.4	11.8	10.0	10.6	9.0	3.2	3.2	3.2	3.2	6.0	5.9	6.0	5.2		
Works sometimes	0.0	0.0	0.0	0.0	1.8	1.6	1.5	1.4	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.3	0.9	2.3	1.9	2.3	4.9	4.9	4.9	4.6	1.3	1.4	1.3	1.4		
Females																														
Works regularly	4.5	4.5	4.5	4.5	13.2	13.8	13.7	9.1	3.3	3.3	3.3	3.3	2.4	2.4	2.4	0.4	11.6	10.2	12.5	9.3	7.4	7.4	7.4	5.7	7.7	7.7	8.0	5.5		
Works sometimes	0.0	0.0	0.0	0.0	0.9	0.2	0.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	3.0	0.9	2.5	1.4	1.4	1.4	1.4	0.7	0.7	0.4	1.5		

P = Planting, W = Weeding, H = Harvesting, M = Marketing.

KFHYA  
ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Percentage Distribution of Population over 15 years of age, Working on Selected Crops, Livestock and Other Activities, by Sex

	Coast	Eastern	Central	Rift Valley	Nyanza	Western	National Total
<b>POULTRY CARE</b>							
<u>Males</u>							
Works regularly	2.4%	2.7%	3.0%	3.4%	4.6%	1.1%	3.0%
Works sometimes	3.7	3.0	1.3	4.5	6.3	0.7	3.5
<u>Females</u>							
Works regularly	8.2	5.7	7.5	14.6	11.8	4.2	9.2
Works sometimes	3.7	3.6	2.3	1.1	3.7	0.7	2.5
<b>STALL FEED</b>							
<u>Males</u>							
Works regularly	0.8	9.7	25.6	4.6	3.2	6.7	8.1
Works sometimes	0.0	4.3	9.5	3.1	1.2	4.2	3.7
<u>Females</u>							
Works regularly	1.2	14.1	45.2	6.8	2.8	9.9	12.3
Works sometimes	0.0	4.2	5.9	1.7	1.6	1.8	2.7
<b>GRAZING CATTLE</b>							
<u>Males</u>							
Works regularly	9.8	25.3	28.5	24.8	34.0	22.6	25.2
Works sometimes	3.3	12.7	8.9	20.4	11.1	11.7	13.1
<u>Females</u>							
Works regularly	4.9	24.8	29.8	36.1	15.7	15.2	24.1
Works sometimes	4.5	13.7	7.9	16.9	19.4	14.1	14.0
<b>MILKING CATTLE</b>							
<u>Males</u>							
Works regularly	6.5	11.3	19.7	7.9	14.8	14.8	11.8
Works sometimes	1.2	5.5	10.5	13.4	10.2	4.6	6.3
<u>Females</u>							
Works regularly	6.9	38.3	35.1	57.9	32.6	19.1	37.4
Works sometimes	2.0	4.6	9.8	3.0	7.2	4.6	4.9

Percentage Distribution of Population over 15 years of age, Working on Selected Crops, Livestock and Other Activities, by Sex

	Coast	Eastern	Central	Rift Valley	Nyanza	Western	National Total
<b>GRAZING GOATS/SHEEP</b>							
<u>Males</u>							
Works regularly	19.6	25.0	24.6	17.6	21.5	13.4	20.9
Works sometimes	10.6	17.0	10.5	12.8	9.3	7.4	12.5
<u>Females</u>							
Works regularly	15.1	35.9	39.3	28.7	10.6	16.6	26.7
Works sometimes	9.8	15.4	6.2	10.8	17.1	7.1	12.2
<b>FOOD PREP./COOKING</b>							
<u>Males</u>							
Works regularly	6.9	4.6	5.6	4.9	3.0	3.9	4.7
Works sometimes	2.0	3.3	5.6	3.1	1.4	6.0	3.4
<u>Females</u>							
Works regularly	91.0	88.2	88.9	92.1	88.9	91.5	90.0
Works sometimes	1.6	1.7	1.0	1.1	0.9	1.1	1.3
<b>HOUSE CLEANING</b>							
<u>Males</u>							
Works regularly	9.0	4.9	6.6	4.2	2.1	2.8	4.6
Works sometimes	1.6	3.3	2.6	1.5	1.9	6.7	2.8
<u>Females</u>							
Works regularly	88.2	88.2	89.8	90.6	90.5	92.2	89.7
Works sometimes	2.4	2.0	1.0	2.8	1.6	1.4	2.0
<b>CHILD CARE</b>							
<u>Males</u>							
Works regularly	2.9	1.5	1.6	1.0	0.7	0.4	1.3
Works sometimes	5.7	3.4	4.3	1.4	9.0	9.9	4.7
<u>Females</u>							
Works regularly	63.3	58.7	65.9	64.8	66.2	64.3	63.2
Works sometimes	2.0	3.6	0.7	2.5	3.0	0.4	2.4
<b>BUYING FOOD</b>							
<u>Males</u>							
Works regularly	37.6	23.1	18.0	30.7	6.3	20.8	22.9
Works sometimes	19.2	16.6	17.4	25.9	31.9	27.6	22.8
<u>Females</u>							
Works regularly	52.2	77.7	85.6	66.1	76.6	74.2	71.4
Works sometimes	16.7	9.0	4.6	16.3	10.0	9.5	11.3

Percentage Distribution of Population over 15 years of age, Working on Selected Crops, Livestock and Other Activities, by Sex

	Coast	Eastern	Central	Rift Valley	Nyanza	Western	National Total
<b>FETCHING WATER</b>							
<u>Males</u>							
Works regularly	9.0	4.8	6.6	4.9	3.5	3.9	5.1
Works sometimes	3.3	3.6	3.0	3.2	1.2	3.2	3.0
<u>Females</u>							
Works regularly	88.2	86.5	88.5	90.7	90.5	91.9	89.1
Works sometimes	2.0	2.1	1.0	2.5	1.4	1.8	1.9
<b>FETCHING FIREWOOD</b>							
<u>Males</u>							
Works regularly	9.8	5.2	7.9	4.2	3.0	4.9	5.2
Works sometimes	2.0	4.8	6.2	2.7	1.4	5.7	3.7
<u>Females</u>							
Works regularly	85.7	87.1	89.2	89.7	88.9	91.5	88.6
Works sometimes	3.7	2.5	2.0	2.5	1.6	1.8	2.3

Source: ROK, Integrated Rural Surveys 1976-79. Basic Report, 74-77.



## ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

## Farmer Practices in Cultivating Maize and Beans (1981)

Practice/Operation	High Income Farmers	Low Income Farmers
Time of Planting	Five days after the rains begin	Ten days after the rains begin
Seed Treatment	None	None
Method of land preparation/planting	Ox-plough, maize in rows beans broadcast before plowing	Same
Maize plant density	Row with-108 cm. Between plants-31 cm. Plant pop.-29,700	Row width-110 cm. Between plants-37 cm. Plant pop.-24,900
Bean plant density	Plant pop.-160,000	Same
Maize variety for main stock	Local or H-511	Local
Maize variety for early maize	Katamani or none	Katamani
Bean cultivator	Canadian Wonder	Same
Weeding	One or two times if needed. Weed control is effective.	Same
Plant protection	None	None
Fertilizer	None	None
Manure application	None in last year	None in last year
Fallow or rotation	None (previous crop is maize-beans inter-cropped)	Same

Source: Franzell, Ph.D. Thesis, P.171

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Estimated Increases in Irrigated Agriculture, Njemps  
Location: 1970-1981

Area	1970		1981	
	No. Farmers	Ha.	No. Farmers	Ha.
Ngambo	82	49	157	151
Lamelok	-	-	63	19
Elduwa	34	16	38	20
Loiminange	-	-	26	24
Rukus	-	-	21	22.8
Mukutani	40?	20	52	25

Translated to the livestock-producer level, a goat in Njemps was equivalent on the market in 1969 to 3-4 debes of maize. At present, the exchange rate is two debes of maize per goat. Similarly, prices for finger millet in relation to livestock have also increased; the amount of finger millet the II Chaus could buy for one goat in 1969 now must be exchanged for two goats.

Source: Peter Little (1984): P.17

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Relationship Between Stock Ownership and Irrigated Holdings

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<u>Wealth Classification</u>	<u>Range of Stock Units</u>	<u>Average Farm Size (ha.)</u>
Very Rich (1)	66 - 262	1.60
Rich (2)	47 - 65	1.35
Middle High (3-H)	31 - 46	.76
Middle Low (3-L)	17 - 30	.55
Poor (4)	8 - 16	.29
Very Poor (5)	0 - 7	.15

n = 60 homesteads

\* correlation coefficient is .6112

\*\* level of significance between the two variables in .005 using t test.

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Source: Peter Little, Ph.D, Thesis, P.271

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

District Rankings of Contributions to Harambee Projects and Wealth, 1977

<u>Harambee contributions</u>		<u>Wealth</u>
Kakamega	1	Mombasa
Kiambu	2	Nakuru
Murang'a	3	Kiambu
Meru	4	Kisumu
Nyeri	5	Kericho
Machakos	6	Machakos
Bungoma	7	Nyeri
Kisii	8	Kakamega
Nakuru	9	Uasin Gishu
Embu	10	Meru
Kajiado	11	Murang'a
Taita/Taveta	12	Kisii
Laikipia	13	Trans-Nzoia
South Nyanza	14	Nandi
Kirinyaga	15	Bungoma
Kitui	16	South Nyanza
Baringo	17	Kilifi
Nyandarua	18	Embu
Kisumu	19	Nyandarua
Mericho	20	Kirinyaga
Siaya	21	Laikipia
Mombasa	22	Taita/Taveta
Kilifi	23	Kitui
Busia	24	Kajiado
Kwale	25	Kwale
Narok	26	Siaya
Trans Nzoia	27	Baringo
Lamu	28	Busia
Elgeyo/Marakwet	29	Elgeyo/Marakwet
Turkana	30	Wajir
Nandi	31	Garissa
Uasin Gishu	32	Narok
Mandera	33	Marasabit
Samburu	34	Isiolo
Wajir	35	Tana River
Marsabit	36	West Pokot
Tana River	37	Lamu
West Pokot	38	Samburu
Isiolo	39	Turkana
Garissa	40	Mandera

Source: Thomas, 1980, Appendix 1. Harambee Contribution Ranking from Research and Evaluation Unit, Ministry of Housing and Social Services, 1977. Wealth Ranking calculated by author from Statistical Abstract.

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Community Development

District	Number of self help projects	Percentage of soil conservation	Percentage of afforestation	Peoples Contribution in Kenyan pounds	Staff
KITUI	1373	0.9%	???	796,753	16 Govt staff 21 SDAS
MACHAKOS	1402	12%	1.3%	1,122,986	33 Govt staff 47 SDAS
EMBU	313	0.4%	0.2%	522,527	20 Govt staff 17 SDAS
MERU	1072	-	1%	651,381	24 Govt staff 48 SDAS
ISIOLO	59	-	-	20,738	14 Govt staff 11 SDAS
BARINGO	491	-	-	308,506	17 Govt staff 13 SDAS

NR: Except for Baringo the SDAS (Social Development Assistants) are employed by the local Authorities but seconded to the Department of Social Services.

Source: MCSS (1986)

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Registered Groups per District (ASAL) Area

District	No. of Reg. Womens Groups	Total Membership	No. of W/G Assisted and Amount
Baringo	69	6,010	Kshs 50,000 for 10 groups
Laikipia	339	12,361	Kshs 86,000 for 10 groups
Isiolo	55	1,570	Kshs 112,500 for 10 groups
Embu	294	10,287	Kshs 144,000 -
Meru	1,045	43,284	Kshs 90,000 -
Kitui	1,439	37,402	Kshs 90,000 for 10 groups
Machakos	1,300	48,847	Kshs 100,000 for 10 groups
Turkana	184	8,174	Kshs -

- It has not been possible to know the percentage of womens groups receiving seed money income-generating projects plus the total amount that has been received.

Source: NESS

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

BUDGET RATIONALIZATION AND GOVERNMENT SESSION PAPER NO. 1 AND THEIR IMPACT  
ON ASAL PROGRAMMES

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KENYA

ARID AND SEMI-ARID LANDS DEVELOPMENT

BUDGET RATIONALIZATION AND GOVERNMENT SESSION PAPER NO. 1 AND THEIR IMPACT  
ON ASAL PROGRAMME

A. Budget Rationalization 1/

1. This Annex provides important background material for Annex 4, District Development Initiatives and an ASAL Development Fund, and for the main Issues and Options Paper. The recent government policy initiatives discussed in this Annex will have major repercussions on any new or proposed development actions. The emphasis on the nature and goals of projects and programmes and on the budget implications shows that Government is taking a serious stand on bringing development more under control than in the past.

Background

2. After the expansionist period of the late 70s fuelled by high coffee and tea revenues, in recent years Kenya has experienced a number of economic crises and a considerable redirection in its economic growth. Increases in oil prices and a decline in Kenya's terms of trade combined with the current world recession and the persistent drought of 1984, resulted in severe pressure on the government budget. This pressure continues and with the low economic growth rates projected for the coming years tight budgets will be a key element in all development planning.

3. Four aspects linked to resource constraints have been emphasized by Government in presenting its programme of budget rationalization. First, as a result of the slow growth of the economy in the last ten years, government revenues have not been increasing in relation to the expenditure needs and the Government is thus facing a serious resource constraint in financing the budget. Ordinary revenues which used to be around 25% of the GDP in the early 80s had fallen to 22% by 1984/85 and are not expected to increase significantly in the next three years. Second, the cumulative deficits of past years will have a continuing impact on Government's growing obligation to service its debt. External debt service consisting of interest and redemption payments on past borrowing has been growing at an alarming rate and is cutting into total government resources available for expenditures. The share of interest and redemption payments on external and internal borrowings has increased from 12% of the total government annual expenditures in 1980/81 to 25.2% in 1986/87 and is projected to grow to 30% by 1989/90. Third, future budgetary deficits and the borrowings to finance them will have to be restrained further as a result of increasing debt service payments. The annual targets for budget deficits, laid down in the Fifth Development Plan (1984/88) imply that these should be reduced to 3.4% of the GDP by the year 1988/89. Fourth, the above three constraints imply that there is a limit to the growth of total ministry expenditures, which is

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1/ Parts of this section have been taken from a paper entitled "Budget Rationalization Programme" presented by Mr. H.M. Mule, Permanent Secretary of the Ministry of Finance, January 1986.



reflected in the ceilings given to the ministries by the Treasury. In view of the resource constraints, Government spending is projected to fall from 24.2% to 22.8% of the GDP by the year 2000. Therefore it will be difficult to expect any major increases in the expenditure levels during the next four to five years and with the current priority given to ASAL areas (Session Paper No. 1, 1986), major increases should certainly not be expected for ASAL areas.

#### Trends in Use of Financial Resources

4. These trends in fiscal stringency have had important repercussions in the use of government resources. First, the share of investments as seen in the development vote <sup>1/</sup> has been substantially reduced from 32% of the total budget in 1980/81 to 25% in 1986/87. In real terms development expenditures have declined from a level of Ksh 206 million in 1980/81 to Ksh 170 million in 1984/85 (at constant 1976 prices). As a result, the available budgetary resources for development have been spread too thinly across a large number of underfunded projects instead of being concentrated on the more important productive and high priority ones. A further repercussion is that investments have been stretched over time beyond target completion dates leading to cost escalation and postponement of likely benefits to the economy.

5. Second, funds available for the operation and maintenance of existing services, infrastructure and facilities through the recurrent vote has also been declining from nearly 57% of the total budget in 1980/81 to 50% in 1986/87. This decline in operating funds has been further aggravated by the increasing share allocated to salaries which has risen from 47% of the recurrent vote in 1979/80 to 67% in 1985/86. This is due to the fact that government employment has been increasing at the rate of 7.4% a year since 1974, almost twice the annual growth of the labour force. The share of salaries in the recurrent expenditures of the ministries is likely to increase even further as a result of the recent salary revisions. If the ministries continue the same trends in recruitment to government services, there will be few resources left for operating expenditures leading to a situation where most employees will sit around drawing salaries, unable to perform economically meaningful services to the public. This is already prevalent in certain areas where sufficient priority has not been assigned or where external funding, such as through certain ASAL area development projects, has not been available. Ways must be found to not only make more funds available for operation and maintenance but possibly more important to create or support more activities which require little or no inputs from government services - self-help, community/group managed projects with a limited scope are a case in point.

6. Third, a disproportionate share of the available resources is being utilized for the social services sector, namely for education, health, water and other social services, particularly when compared with countries with similar income levels and stage of development. Expenditures on social services have increased almost 12 times in real terms (at constant 1976 prices) between 1964/65 to 1984/85 from Ksh 17 million to Ksh 197 million. The Government has now recognized this fact and has decreed (Session Paper No. 1, 1986) that the balance must shift away from expenditures on social

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<sup>1/</sup> In principle, those budget items which are development oriented, i.e. not regular expenditures required to cover ongoing government financial commitments such as salaries, vehicle operating costs, etc..

services in favour of outlays on more productive activities which make a greater contribution to the economy in the short-term.

7. Fourth, the present investment portfolio as reflected in the development estimates contains a number of projects and programmes, a proportion of which are externally supported, which would not now be considered as priority projects and which do not reflect the present resource constraints. A number of these projects presuppose substantial uptake of recurrent costs by the Government after donor support ends in spite of the inability in most cases for government to meet these obligations. This is one of the reasons why Government in its proposals to the donor community <sup>1/</sup> strongly requested that donors consider providing grants and soft loans for budget support not specifically tied to particular budgeted expenditures, that would help meet Government's increasing recurrent cost burden. While this may prove difficult, the donors have increasingly shown a willingness to provide more support in the form of recurrent cost financing but normally closely related to specific development initiatives in one sector (e.g. The Animal Health Services Rehabilitation Project - 1985).

#### Forward Budget

8. The Forward Budget in combination with budget ceilings are the main mechanisms for budget control and discipline. The Forward Budget, which is essentially a planning tool, was initially introduced in 1973. Used originally as a means for planning of development projects and programmes, it was not until the economic crisis of the late 70s/early 80s and the imposition by the Government in concurrence with the International Monetary Fund of expenditure ceilings that the Forward Budget took on major significance. It is a three year rolling budget which is updated each year and forms the basis for the Annual Development and Recurrent Budget. The line ministries now adhere strictly to the process and in fact forward budgeting has also been introduced at the district level with the preparation of five year development plans and annual updating through Annexes.

9. The budget ceilings are defined as gross ceilings; in other words, they officially take no account of the revenues and as such the fact that a ministry can find 100% financing for a project from a donor even on grant terms does not mean that the expenditures can be accommodated or that the ceiling can be raised. However, it appears to be an accepted principle that if a project or more likely a programme can incorporate an increased level of cost recovery, i.e. reducing the net outlay, some latitude in interpreting the ceiling to allow for the inclusion of such a programme can be expected. But, if one strictly follows the Ministry of Finance's guidelines, there is a fixed ceiling each year for government expenditure and thus any increase in the ceiling for one ministry must come from that of another ministry. The gross ceiling for 1986/87, which is interpreted as the budget deficit taken as a percent of GDP, is K£ 228.6 million (US\$286 million), equivalent to 3.7% of GDP. When added to the anticipated revenues made up of ordinary revenue (sales tax, income tax, import duties and other taxation), Appropriations-in-Aid (user charges for government services and other non-tax revenues budgeted within the recurrent expenditures of the

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<sup>1/</sup> Government of Kenya, "Implementation of Budget Rationalization Programme-Mechanisms for Donor Support", Discussion Brief 1/86, Ministries of Finance and Planning and National Development.

ministries) and external grants (not loans) from donor agencies, the net ceiling or overall limits of expenditure for 1986/87 would be K£ 1,796.8 million (US\$2,246 million), with the revenues expected to total K£ 1,568.2 million (US\$1,960 million).

#### Key Elements in the Budget Rationalization Programme

10. Although informally in effect for some time, budget rationalization has received more attention and has been more specifically defined in terms of its objectives in the past year. The Budget Rationalization Seminar of 19-20 August 1986 where papers were presented by the Permanent Secretaries of Finance, Planning and Office of the President and the inclusion of budget rationalization in Session Paper No.1 (1986) as one of the key cornerstones of government policy have put it very much in the forefront. As such it is imperative that any development initiatives are responsive to the goals of the programme. These are stated as follows:

- a) the operating ministries should concentrate the available resources for development on a fewer number of projects to shorten the average completion period and to bring new capacity into service as soon as possible. Poorly performing or low priority projects should be eliminated or phased out in order to ensure that only projects with potentially high productivity are included in the budget and fully funded;
- b) projects included for funding should be more carefully selected for efficiency, contribution to productivity and growth and be consistent with the Development Plan. The operating ministries should develop clear priorities for the distribution of funds within the sectors as the basis for selection of projects. New development projects and parastatal investments should be funded only if they are productive investments with very high priority;
- c) ministries should ensure that in selecting projects district priorities are fully taken into account consistent with the national policy of District Focus; and
- d) ministries should give the highest priority to the allocation of funds for improving the utilization of existing capacity and for operating expenses of completed projects and existing staff, instead of establishing new facilities or services. The recurrent expenditure implications of completed and ongoing development projects should be assessed and the ministries should set aside sufficient resources to fund these expenditures in the coming years, to improve the utilization of completed facilities.

#### Budget Rationalization and the ASAL Areas

11. The Budget Rationalization Programme applies equally to ASAL areas as to other parts of the country. However, two aspects are worth noting. First, the strong orientation to productive projects must be a gradual one in ASAL areas because of the current limited number of proven technical solutions and the necessity to have a strong self-help component of most actions to ensure their sustainability. Second, as the ASAL areas are unlikely to receive any significant increase in budgeted resources, if anything the resources in real terms might be reduced, development efforts will have to be designed with this in mind and the provision of support services which are currently largely inoperative will have to be reassessed.

12. It is difficult to estimate the proportion of the development and recurrent budgets currently going to the 22 ASAL districts. Nevertheless, the amount of resources are supplemented by donor projects which provide an additional US\$7.5 million annually over and above what is included in the estimates. It cannot be expected that this amount will be substantially increased (see para. 20) unless a new mechanism for channelling investment in productive activities, separate from area development projects and limited technical input projects, can be found.

B. Session Paper No. 1 (1986)

Introduction

13. Session papers are a standard means used by the Kenyan Government to indicate adjustments to the development plan currently under implementation. Session Paper No. 1 of 1986, Economic Management for Renewed Growth, is a departure from this normal practice in that it proposes reorientation of government objectives in the form of a framework or strategy for development and growth of the economy. As such it is intended to provide guidance for the preparation of the next development plan (1989-1993) as well as helping to orient development efforts during the remainder of the current plan period. In fact, the commitment of Government to the Session Paper would indicate that any donor would be unwise to present projects or programmes which do not support the main principles presented.

14. The Paper is basically a response to the recognized problems of a rapidly increasing population (4.3% annually) caused by the highest fertility rate in the world - the average woman gives birth to almost eight children - and the repercussions of this high population growth rate in terms of employment, provision of basic needs and economic growth. The assumption is made that there is little scope for drastically altering the rate of population increase; it is assumed therefore that national planning through to the year 2000 will have to accommodate it. As a result is concluded that the only means to productively accommodate the population is to generate increased economic growth through reinforcing certain existing policies and introducing new ones.

Main Goals and Related Initiatives

15. The key to economic growth and accommodation of the rapidly expanding working age population is employment creation. It is stated that "jobs will have to be created at historically rapid rates: from 3.8% a year on small farms to 4.5% a year or more in the modern wage and informal sectors, rural and urban." 1/ These rates compare to the average rate of increase between 1972 to 1982 of less than 3.4% a year. Closely linked to this is the recognition that the majority of these jobs (80% is quoted) will have to come from the agricultural and informal sectors where most of the nation's employment is already. The difficulty in doing this is emphasized by the cost of creating a new job in the modern sector, say in industry, has been found to approach K£ 16,000 (US\$20,000) per worker.

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1/ Government of Kenya, Economic Management for Renewed Growth, 1986, page 9.

16. The second cornerstone of the proposed policy is the channelling of funds to help reorient the rural-urban balance. The inexplorable expansion of Nairobi and Mombasa is to be offset by emphasizing the development of small rural centres which are to be built up as the foci for their surrounding agricultural areas. If agriculture is to be the motor of this renewed economic growth, these rural centres will have to be strengthened through injection of investment so that they can on one hand capitalize on the increases in production through downstream processing and on the other better suggest agriculture through provision of services. Both are intended to help create additional employment in the rural sector. This initiative is closely tied to the District Focus Policy (see Annex 4, Section A for discussion) and the strengthening of the district as the key administrative level to direct development.

17. The third orientation is the provision of basic needs - food security, productive work and housing. Education and health although considered to be important have been seen to have received an inordinate share of government resources in recent years and consequently, resource allocation will in future be more directed to productivity related activities.

18. The underlying theme of the Session Paper is productivity and how to improve it through well planned policies and programmes. This is closely linked to initiatives in the Budget Rationalization Programme, such as: (i) concentration on fewer and higher priority projects, and (ii) selection of projects for efficiency and greater productivity.

#### Areas for Donor Assistance

19. In the seminar recently held for donors on the Session Paper, 1/ a number of areas were identified within which the donors could make a positive contribution. The first, budget rationalization, has already been discussed in Section A of this Annex. The Government sees the Budget Rationalization Programme as an integral and necessary element in the implementation of the policies put forward in the Session Paper. The second area for support is the strategy for rural-urban balance which foresees that the donors could provide funding for infrastructure items to help make the rural trade and production centres better able to serve the agriculture hinterland. This could include rural access roads, water supplies, etc. A third area is the provision of credit for the informal sector either through commercial banks or other lending institutions. A lead has already been taken by USAID which is about to finance a pilot small enterprise credit scheme by channelling funds through the Central Bank to the commercial banks. The fourth area is stated as being, "emphasis on agricultural and livestock sector", and includes a number of suggestions for support amongst which are assistance for:

- a) introduction of new high yielding varieties of arabica and expansion of robusta varieties into Western Nyanza and Coast Provinces; coffee is projected to be the key crop in terms of export potential;

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1/ Government of Kenya, Implementation of Session Paper No. 1 of 1986, Discussion Brief 2/86, August 1986.

- b) development and expansion of smallholder tea areas and government-owned tea estates;
- c) improvement of beef production through upgrading the system of stock routes, increasing market information and development of cattle water points for nomadic herdsman;
- d) improvement in livestock disease control;
- e) support for horticulture marketing;
- f) increasing the amount of credit available to farmers;
- g) increasing funding of extension services; and
- h) increasing funding for research.

#### Implications for ASAL Development

20. The Session Paper makes only passing reference to the ASAL areas in three paragraphs in Chapter 5, Agriculture and Food Security. The whole thrust of the Paper is to maximize production from the higher potential areas concentrating the maximum amount of resources possible on those districts and on the seven commodities - coffee, tea, maize, wheat, milk, meat and horticultural crops - which are considered to hold the greatest potential for expanded production. This bias towards the higher potential areas brought a strong reaction from the Cabinet, where over 50% of the members represent ASAL districts.

21. The Session Paper does acknowledge, however, that the ASAL areas represent "a potentially important resource which, if managed carefully, can help serve the income, employment and food self-sufficiency goals of the Session Paper".<sup>1/</sup> This would appear to be true. There is potential, albeit limited, to create more employment (para. 14) in the ASAL centres; this is also true for the ability to raise incomes, as the Kitui ASAL Project demonstrated. Due to the low population densities, only limited expansion of the urban areas (para. 15) in ASAL can be expected. And food self-sufficiency (para. 16) can certainly be improved with the introduction of new higher yielding varieties of crops well adapted to arid zones such as sorghum and millet and the better use of soil moisture shown to be attainable through, amongst other techniques, water harvesting. A key element missing at the moment is a well defined ASAL strategy within which these actions can be best channelled. With a truly operational strategy in place and a mechanism to review and assess the progress and success of ASAL techniques and packages and to determine their adaptability to other districts, it will become possible to be able to capitalize on the potential referred to earlier in this paragraph.

22. The Paper in fact discusses four aspects of ASAL development that could contribute to the targets set out in the Paper.

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<sup>1/</sup> Government of Kenya, Economic Management for Renewed Growth, 1986, pp.84 and 85.

- a) "Livestock is the basis for the ASAL economy. Measures to improve the breeding of sheep and goats, to develop stock routes and water supplies, and to control livestock diseases are central to ASAL development. Links between ASAL regions and the higher potential areas can be intensified through a programme under which ASAL herders produce immature animals for fattening in the high potential areas.
- b) Crop research and development will focus on drought-resistant crops and suitable grasses to prevent erosion.
- c) Small-scale irrigation, if suitable and inexpensive technologies can be found, will help provide food security. Exploitation of sub-surface water, dams to conserve run-off water, and roof catchments will all be explored as ways to tap water resources.
- d) Environmental protection will be essential to maintain a viable economy in ASAL regions. Reafforestation will serve the three purposes of protecting watersheds, preventing soil erosion and providing fuelwood." 1/

This is set within the context of the necessity to follow the precepts of budget rationalization and to bring the current ASAL development projects, many of which use direct financing and procurement, within the budget.

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1/ IBID, P.85.

KENYA

ARID AND SEMI-ARID LANDS DEVELOPMENT

DISTRICT DEVELOPMENT INITIATIVES AND AN ASAL DEVELOPMENT FUND

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APPENDICES

1. Application for a Grant from Rural Development Fund
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3. Terms of Reference



ACRONYMS

AFC	= Agricultural Finance Corporation
AIE	= Authority to Incur Expenditure
DC	= District Commissioner
DDC	= District Development Committee
DEC	= District Executive Committee
DDO	= District Development Officer
DPU	= District Planning Unit
DVDC	= Divisional Development Committee
EEC	= European Economic Community
EEC-MPF	= EEC Micro Project Fund
KANU	= Kenya African National Union
KIA	= Kenya Institute of Administration
LDC	= Locational Development Committee
MESS	= Min. of Culture and Social Sciences
MENR	= Min. of Environment and Natural Resources
MPND	= Min. of Planning and National Development
NGO	= Non-Governmental Organization
OP	= Officer of the President
PMEC	= Provincial Monitoring and Evaluation Committee
RDF	= Rural Development Fund
SLDC	= Sub-Location Development Committee
TA	= Technical Assistance

KENYA

ARID AND SEMI-ARID LANDS DEVELOPMENT

DISTRICT DEVELOPMENT INITIATIVES AND AN ASAL DEVELOPMENT FUND

A. District Focus Policy 1/

Background

1. Decentralized planning has been part of the broad development philosophy of Kenya practically since Independence. As early as 1965, Government Session Paper No. 10 established the general principle that decentralized planning should be used based on local inputs. While the principle of a decentralized bottom-up approach was often expounded, the main planning and implementation of government programmes came from the top down through the Provincial Administrations to the districts. In spite of numerous statements of the importance and need for decentralized planning and control of Government's development initiatives, it was not until 1975/76 that an attempt was made to produce district development plans and not until 1983 that decentralized planning and the district as the main administrative focus of Government took on more meaning. In the interim, one important activity was initiated. Coming out of the District Development Grants of 1971, for funding locally identified projects with large self-help components, and the Rural Works Programme of 1974, for small labour intensive projects, the Rural Development Fund was created in 1974/75. It combined Government of Kenya financing with donor support and was, and still is, the only major source of district specific funds available to the District Commissioner.

2. Although up until 1983 there were numerous and well intentioned initiatives to direct more planning and implementation to the districts, what normally happened was that the line ministries at HQ level did the planning, sometimes with a district label on it, and the programmes were executed virtually through line ministry staff at the district level. The district administration played a minor and mainly coordinative role. In retrospect, this is not surprising. The districts did not have any real planning capacity, apart from district line ministry staff practically all other district staff were Office of the President (OP) appointees, from the DC down, whose main job was the day-to-day administrative matters of the district. In addition, the decision making power for development actions lay in the hands of HQ and provincial officers; the district staff basically carried out orders. Furthermore, the districts did not have the financial mechanism nor training to handle district level development, the District

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1/ Much of the discussion in this section is drawn from the numerous documents on the District Focus Policy and in particular from two government publications: District Focus for Rural Development, Nairobi (Government Printer), June 1983 and a recent document from the Ministry of Planning and National Development, Rural Planning Department, District Development Planning in Kenya, (authors John M. Cohen and Richard M. Hook), January 1986.

Treasury was too limited, the District Tender Board was restricted in what it could approve, and the district accounting procedures were too rudimentary. In other words, the planning and implementation capacity of the districts did not live up to the rhetoric.

3. In accessing the slowness in uptake of decentralized planning, the Government identified the constraints at the time as being the following:

- "insufficient number of trained District Development Officers (DDOs);
- inability of many District Development Committees (DDCs) to initiate and oversee the district planning process;
- inadequate guidelines from the Treasury on budget ceilings and lack of sufficient disaggregation of budget allocations by operating ministries to districts;
- skepticism by provincial and district planners over the use of district plans by central ministry decision makers;
- poor liaison between planners and operating ministries in developing sectoral recommendations;
- insufficient data to carry out planning exercises and difficulties in convincing some units of operating ministries to generate desired data, or even to share existing data;
- insufficient participation by popular representatives in the DDCs; and
- financial information systems at the ministerial level that made it extremely difficult to disaggregate planned or actual expenditures to the districts". <sup>1/</sup>

#### District Focus Policy - 1983

4. Two main factors contributed to bringing about what is now called the District Focus Policy: first, the pressure by the President, Daniel arup Moi, to turn the rhetoric into fact and make the districts operational centres for rural planning and implementation, and second, the issuance in 1982 of the report by the Working Party on Government Expenditure which stipulated that scarce domestic resources should be more efficiently applied with more involvement and contribution by the people which in turn resulted in the proposal that the district should become the focus for this initiative. In 1983, the District Focus Policy became officially sanctioned and a major force in reorienting Government's activities.

5. This strategy was summed up by the President in a speech of June 5, 1985, when he stated:

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<sup>1/</sup> Government of Kenya, District Development Planning in Kenya, P.30.

"First, the people will be directly involved in the identification, design, implementation and management of projects and programmes. This will make development more consistent with the needs and aspirations of "wananchi". Secondly, the decision-making structure will centre around the districts themselves. This will minimize the delays that often characterize centralized decision-making systems. Thirdly, and most equitably, it is being directed to areas of most need."

6. He followed up this statement by emphasizing the following points: (i) the strengthening of planning capacity at the district level; (ii) improvement of horizontal integration among operating ministry field agents; and (iii) expansion of authority of district officers for managing financial and procurement aspects of local project implementation.

7. In functional terms, the District Focus is intended to: revitalize the DDCs and increase their supervisory authority over operating ministry field agents; upgrade district planning capacity through the creation of District Planning Units; train DCs and DDOs; increase the financial resources available at the district level for managing development activities; and redeploy technical personnel from the headquarters to the districts. While before the District on paper had considerable authority, in fact, the DC's powers were limited and the line ministries had most of the power. The strategy has increased the DC's supervisory and disciplinary authority over field agents of the operating ministries, largely by making him directly responsible for the activities of the new District Executive Committee (DEC), the District Treasury, and the District Tender Board. It also promoted district interests by attempting to require operating ministries to base their activities on district plans and priorities, to disaggregate their budgets to the district level, and to guarantee the funding of district identified projects within their established budget ceilings.

8. The DEC comprising the DC, DDO, all technical Department Heads, clerks of local authorities, and representatives of development related parastatals was established because as the District Focus strategy gathered momentum the DDC meetings became increasingly too large and unwieldy, sometimes running 90 or more attendants. Today, the DEC also is becoming too large, some having up to 40 members. The DDC and DEC are the final link in the district chain. Development committees have also been formed at the divisional, locational and sometimes even sub-locational levels. But to date only the Divisional Development Committees (DVDCs) meet regularly. The two lower level committees (LDCs and SLDCs) lack the orientation and training to fulfil the role placed on them which is to identify viable projects and subsequently evaluate, prioritize and roughly cost them, a role that they should possibly not even try to fulfil. If they can ensure that a dialogue is maintained with the people and that project ideas and even basic needs are properly represented and passed up the system, the divisional and district level officers and development committees can be left with the responsibility for evaluating and costing the proposals.

9. While the DDC, DVDCs, LDCs and SLDCs are essentially a political forum for representing the wishes and needs of the people, it is the DEC that is the technical body that represents the district. As such it receives support from three places: line ministry staff, technical development committees and the District Planning Unit (DPU). The first goes without saying as the district heads of each line ministry are on the DEC. The

second involves inter alia the following committees: the District Agricultural Committee, District Education Board, District Community Development Committee, Joint Loans Board and in some districts, the ASAL Steering Committee. The third, the DPU, is possibly the most important in interpreting and implementing the District Focus Policy, however, at present the DPU in most districts comprises only the DDO who already has too much to do without taking on the added responsibilities dictated by the new policy. In recognition of this, the DDO is being supported and the DPU strengthened by the creation of the new posts of Assistant DDO and District Statistical Officer. It is expected that a para-professional District Development Engineer will later be added to this team

10. District Focus has brought clearer instructions on project selection to the districts. However, the true representations of the people's wishes and needs through the presentation of projects for support has not been easily forthcoming. The line ministries still tend to develop their own technical programmes and then attribute them to different areas. This is reinforced by the fact that the funding of district programmes and projects still remains very much under the control of the operating ministries. While there was official talk of making available 5% to 10% of their development allocations to districts to help finance the district's priorities, this has yet to occur. Nevertheless, District Focus has increased the financial capacity of the District Treasury to fund on a timely basis the activities of operating ministry field agents while at the same time ensuring that funds are effectively and efficiently expended. Better district accountants are being posted, a new cadre of District Internal Auditors is being deployed, and the practice of pre-auditing project activities is being introduced as part of the District Treasury's functions. To ensure liquidity, the District Cash Float Fund (used to pay AIEs) has been increased, a new payment voucher and audit system for honouring and controlling commitments made in the districts has been introduced, and the rate and manner of reimbursement has been improved. In addition, the district tendering and procurement procedures have been reformed by raising the ceilings on tendering limits for locally obtained items and contracts, adopting more rapid countersignature procedures for large construction projects, and improving the services of the Supplies Branches and the Government Printer.

11. One of the major constraints in effectively implementing the District Focus has been the difficulty in disaggregating the national forward budgets by district. Disaggregation of annual budget allocations is a priority in the case of those ministries which do not currently formulate their budgets on a district or project disaggregated basis. Communication of the disaggregated forward budget to districts is of equally high priority, as without it districts cannot realistically participate in the budgetary process nor have full control over their own development.

#### Training/Institutional Support

12. Training and on-the-job application are critical to the successful introduction of the District Focus Policy, particularly now that many of the structural problems - planning capacity and staffing of the DPU, disaggregation of forward budgets, increased limits on the District Treasuries and Tender boards, etc. - have been recognized and actions taken to help correct them. The Government has appreciated this and has embarked a massive training programme for the districts. The training strategy adopted gave primary responsibility for training for District Focus to the five major rural development training institutions: Kenya Institute of Administration (KIA), the Government Training Institutes at Mombasa and Maseno, and the Embu and Matuga Development Centres. Since the National

Training Strategy was prepared, the training institutions have proceeded to conduct both residential and outreach training activities in support of District Focus. The activities have included, for example, the one month District Focus course for District Heads of Department at KIA, the District Executive Committee Workshops which have been organized by the Government Training Institutes, Mombasa and Maseno, and several pilot activities for Divisional Development Committees. Each of the training institutions has also added a component on District Focus to their regular residential training programmes. Following the training programme for District Commissioners, the districts have also begun to assume a larger responsibility for organizing their own training, and several districts have organized DDC or District Executive Committee seminars utilizing resource persons from the training institutions and from the Ministries of Finance and Planning and National Development.

13. In a recent workshop organized by the Office of the President entitled "Workshop on Development and Harmonization of Training for District Focus", it was recognized that in spite of the considerable effort made over the past two years, the training programmes needed to be accelerated and intensified for all key people in the districts and particular attention need to be paid to Divisional, Locational and Sub-locational Development Committees which up to now have not received very much training due to the limited capacity of the training institutions. It was agreed that this training should emphasize project identification, formulation and implementation, including the mobilization of local resources for development. Thus each district is to form a training team, consisting of appropriate members of the District Executive Committee, supported by the trainer/consultant from the training institution. This District Training Team would first organize a series of Divisional Development Committee Workshops, following which they will then organize a series of shorter workshops for the Locational and Sub-locational Development Committees.

14. The breakdown of the people to be trained and their numbers is as follows:

(a) District Development Committees	( 41)
(b) District Executive Committees	( 41)
(c) Local Authority Department Heads	( 80)
(d) Divisional Development Committees	(200)
(e) Locational Development Committees	(841)
(f) Sub-locational Development Committees and Wananchi	
(g) Provincial and Headquarters Staff	
- Provincial Monitoring & Evaluation Committees	( 7)
- Headquarters Officials	
- Special groups - DCs, DDOs, Chiefs, Departmental Heads, KANU officials and teachers	(3000)

Other target groups identified and listed during the workshop were: self-help groups, Non-Governmental Organizations, Chamber of Commerce, other government officers who were not members of the PMEC, and the DDOs (who have already had some specialised training from the Ministry of Planning and National Development).

15. The core subjects covered by the training programmes are as follows:

- District Focus concepts and procedures;
- administrative and management skills;
- project planning and management skills;
- budgeting techniques and financial management; and
- supplies and materials management.

16. The detailed subjects for each of the key groups is listed below:

a) PMEC Members

- National goals and development strategies
- Techniques for analysing policies, programmes and projects
- Criteria, standards and approaches for impact evaluation
- Techniques for monitoring, getting feedback and report findings
- An overview of feasibility study documents
- Financial control
- Assessment of managerial capabilities, human relations skills and technical skills
- Policy implementation and coordination issues
- Relationship between politicians and public administrators in national development
- Population and development
- Cultural issues in development
- Data collection and analysis
- Developing socio-economic indicators

b) DDCs, DECs and Ministry Headquarters Staff

- National philosophy and development strategies
- Government organization and functions
- Management process
- Project planning, implementation and evaluation

- Public finance
- Supplies and materials management
- Population issues in development
- Training approaches
- Cultural issues in development

c) DVDC and LDC Members

- District Focus objectives and procedures
- Project identification and proposals
- Government organization and functions
- Relationship between politicians and civil servants

Constraints and Potentials

17. Resource Allocation and Authority. The success of the District Focus Policy in terms of introduction of new systems, identification of projects and training of staff has resulted in the districts generating considerable demand for development and building-up expectations within the districts. Unless this is matched with a commensurate allocation of resources the whole operation could flounder. The absence of such resources for most of the period discussed previously has been part of the reason for the equivocal and skeptical response sometimes observed in DDCs when one talks of the District Focus Policy. Not unjustifiably so, the only funding that has been available, and that in limited amounts, has been the RDF and more recently the EEC Micro-project Fund. This raises a broader question which the Government has yet to come to grips with: to what extent does it really want to pass power, particularly financial control over expenditures, to the district.

18. There are a number of ministry programmes, such as Rural Access Roads and Rural Water Supply, where DDCs have had important decision-making powers with respect to project selection, siting, and sequencing, although final resource allocation decisions are still made by the operating ministry. Adding these programmes to those with direct district funding (RDF, EEC) provides a measure of the progress of decentralization over time. In 1976, such programmes totalled about 2% of the development budget. This percentage had risen to about 8% in 1983. Over the longer term, options that have been considered include moving toward a unified district budget, as disaggregation of ministry programmes increases, and establishing a District Development Fund in which each district would have an agreed resource level which could be allocated entirely in accordance with its locally determined sectoral and project preferences. If such shifts in resource allocation authority to districts are to be successful, progress needs to be made in: (i) developing ministry capacity to disaggregate budgets to the district level; (ii) increasing the ability of district personnel to account for larger financial flows; and (iii) restraining the tendency of some ministries to reallocate funds between districts during the fiscal year.



19. While the introduction of these measures would considerably facilitate district initiated development, the shortage of recurrent funds available to district staff greatly constrains the planning and implementation of projects and the provision of support after commencement. As it is unlikely that this situation will greatly improve in the next few years, for the district to have more descretionary funding it will be necessary to improve revenue generation primarily through increased cost sharing thus raising AIAs.

20. District Planning and Implementation Capacity. At present the districts' planning capacity is very limited and the system of development committees that feeds it not fully effective. The DDC is too large and meets too infrequently (twice a year) to fulfil the main development function - thus the creation of the DEC. As previously noted (para. 8), with 35 to 40 members it is also too large and not sufficiently flexible and responsive to be able to meet the emerging needs and changing conditions. A number of options exist but the one that appears to be favoured is to create a small core working group within the DEC that would carry most of the weight of decision making and to bring other people in only as necessary. This would provide the DDO with a much more responsive and operational input into his planning (and implementation) process.

21. To handle the additional work load, the proposed District Planning Unit (DPU) will have to be made a reality as soon as possible. The Unit will require that the additional staff be put in place (para. 9), operating procedures and management concepts be developed and training provided to enable the DPU to operate as a team with clearly defined responsibilities for each member.

22. Identification and Planning of District Development Projects and Initiatives. The greatest commitment and participation of beneficiaries in project execution and even financing has been seen to occur when the people themselves really want the project (mini-project) and have been able to have that need expressed through the development committee system. This is particularly so in the ASAL areas where it is essential to the success of mini-projects to keep the external injection of funds to a minimum and participation of the beneficiaries in the management and running of the projects or activities to a maximum. To date this true "bottom-up" approach has been more rhetoric than reality, particularly regarding productive actions or mini-projects. Two basic things must happen if this situation is to be improved. First, the Locational and Sub-Locational Development Committees must be a more active and become a real forum including participation by the people in the discussion of projects to be proposed. This will require additional training of the committees. Second, there will need to be an interactive process with the people supported by demonstrations by front-line staff from the Ministries of Agriculture and Livestock Development. Only by this combination of the demonstration of techniques and practices to increase production and the interaction with technical staff to make them aware of the funding and support possibilities will a true bottom-up development process be created.

23. The constraints and potentials are discussed very succinctly and in considerably more detail than has been possible here in the government document District Development Planning in Kenya.

B. District Development Initiatives - Rural Development Fund

Objectives, Orientation and Structure

24. With the Rural Development Fund (RDF) having now been in operation for more than ten years, since 1974, there is considerable documentation on its activities. Included amongst this are reports of the government/donor evaluations which took place in 1977, 1979, 1981 and 1985 with a separate mission mounted in 1985 to assess the socio-economic impact of the Fund's operations. <sup>1/</sup> Not only do these documents provide considerable information, but they have been instrumental in adjusting the course of the RDF during its execution.

25. The objectives of the RDF, which have changed little since its inception, are as follows:

- to complement the regular government development programmes undertaken by the various sectorial ministries;
- to encourage the self-help initiatives by providing both financial and technical support; and
- to generate additional employment in the rural areas through public works constructions.

26. The past activities and orientation of the RDF are concisely summed up in the report of the last evaluation mission; <sup>2/</sup> the summary is largely reproduced in the following paragraph.

27. The first period of the Fund (1974-79) might be considered as an introductory one to develop a new instrument for financing small-scale rural development projects as gapfillers for the national development activities. This was executed within the framework of the traditional, centrally planned sectorial development policy in Kenya but without creating the necessary procedures and machinery for the implementation of this new approach. It is therefore not surprising that the Fund ran into several problems. The second period of the Fund (1979-83) might be regarded as the experimental period. With the launching of the Fourth Development Plan (1979-83), the Government of Kenya introduced a policy of making local administrations an important instrument in the identification, planning and implementation of projects in the rural areas. This brought the objectives of what was essentially intended to be a fund focused on the district level more in harmony with government policy and resulted in an improved but still problematic performance. The third period of the Fund (from 1983 and onwards) coincides with the launching of Kenya's Fifth Plan (1983-88). Major features are the introduction of the District Focus Policy for Rural Development and the three year forward budget. It can safely be assumed that the increasing

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<sup>1/</sup> Chr. Michelsen Institute, Kenya's Rural Development Fund - A Study of its Socio-economic Impact, 1985.

<sup>2/</sup> Report from a Joint Evaluation Mission Appointed by the Government of Kenya, DANIDA, NORAD and SIDA, Rural Development Fund, Nairobi, April 1985.

popularity of the Fund at local level and likewise a greatly improved performance of the Fund have significantly assisted the Government in introducing the new development policy. The last two to three years of the Fund's activities have been characterized partly as a period of clearing the backlog and partly as building up capacity to meet the requirements of the Government's future development policy.

28. The RDF is jointly financed by the Kenyan Government and donors, with the Scandanavian countries, Denmark, Norway and Sweden, providing 90% of donor funds on a grant basis. Out of the total funds provided to RDF up to 1984/85, the Government has committed Kenyan pounds 6.75 million (US\$8.4 million) or 37% with DANIDA committing 35% and the others 28%. The funding has increased from about Kenyan pounds 1 million (US\$1.25 million) annually in the early years to Kenyan pounds 3.5 million (US\$4.4 million) in 1984/85. The table on next page provides details. Table 1, Attachment 1 which gives the financing of projects by district for the year 1980/81 to 1983/84 shows that of the average total annual expenditure of Kenyan pounds 2.5 million (US\$3.1 million) over Kenyan pounds 1 million (US\$1.25 million) or about 40% was spent in the 22 ASAL districts.

Grants to RDF 1974/75 - 1984/85  
(Ksh)

Donor	Y E A R S											Total
	74/75	75/76	76/77	77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	
GOK	550,000	1,300,000		20,000	500,000	500,000	1,000,000	1,000,000	500,000	902,640	473,640	6,746,2
DANIDA	277,588	394,525	23,000	699,840	-	-	680,889	562,835	700,000	986,000	1,980,000	6,304,7
NORAD	-	73,529	-	145,940	366,675	375,000	-	-	-	509,600	360,000	1,830,7
SIDA	-	-	-	128,100	435,675	175,650	-	-	333,000	265,000	734,000	2,071,5
Nether-lands	-	154,750	-	313,190	537,995	-	-	-	158,200	-	-	1,164,1
Total	827,588	1,922,804	23,100	1,307,070	1,840,420	1,050,650	1,680,889	1,562,835	1,691,200	2,663,240	3,547,640	18,117,4

Source: RDF Joint Evaluation Mission, April 1985

29. The administration of the RDF is the responsibility of the Ministry of Planning and National Development (MPND) and apart from the EEC Micro-Project Fund it is the only major source of funding directly in support of the District Focus Policy. It is administered by the Ministry's Rural Planning Division with the assistance of an expatriate technical adviser. The current staffing is as follows:

HQ:	RDF Adviser (expatriate)	1
	Deputy Chief Planning Officer	1
	Planning Assistants	4
	Inspectoriate Unit:	
	Planning Officer	1
	Planning Assistant	1
Provincial: (for each province)	Provincial Planning Officer	1
	Provincial Planning Assistant	1
	Engineering Adviser (expatriate)	1

30. At the district level, it is the DDO who is responsible. But, although the selection of projects for financing is made by the districts and presented annually by the DDO, it is the central HQ unit of MPND and RDF that finally approves the projects for inclusion within the following year's funding. The DEC and DDC have no authority to authorize expenditure except over those funds allocated to the district for district administration which come through the Office of the President. All line ministry funds are allocated at the national level through the budget process and only after the budget is approved do district officers receive their Authorities-to-Incur Expenditure (AIE) - the limit being on the grade of the affair.

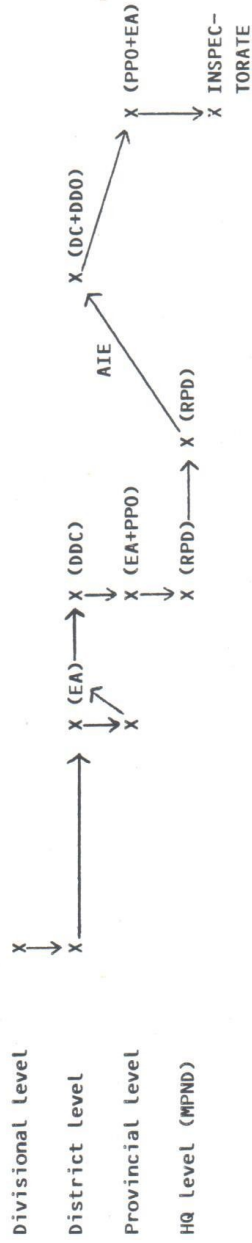
31. The procedure followed in identifying, planning, evaluating and approving a project is shown in the attached chart. The two key people in the cycle are the DDO and the province-based Engineering Adviser. The crucial role currently played by the Engineering Adviser in assisting the technical preparation of projects, appraising projects and generally controlling RDF activities within the Province might on one hand be considered a major strength of the system but on the other could be seen as its key weakness as it makes the efficient operation of the RDF dependent on an outside agent.

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

RDF PROJECT CYCLE

Identification      Planning      Appraisal      Approval      Implementation      Monitoring



- EA - Engineering Advisor
- DDC - District Development Committee
- PPD - Provincial Planning Officer
- RPD - Rural Planning Department (MPND)
- AIE - Authority to Incur Expenditure
- DDO - District Development Officer

Source: Report of the Joint Evaluation Mission, April 1985

32. The RDF project approval process is the following. The projects to be financed by RDF are generated in the districts and applications are forwarded to the Rural Planning Division of MPND by the District Development Committees for final approval. If approved, an Authority to Incur Expenditures (AIE), which forms the financial basis for the implementation of the project, is issued by MPND to the District Commissioner. The validity of an AIE is limited to a two-year period.

33. The allocation by district is made taking into account five factors:

- the district's share of Kenya's population;
- the proportion of low and medium potential land in the district;
- the proportion of the population having regular wage employment;
- an interdistrict equalization factor; and
- the absorption capacity of the district.

34. The fourth factor which is applied using a complex formula is a composite of the other four. The fifth factor takes into account the completion rate of the RDF projects in the district as compared to the average rate for Kenya. In summary, it can thus be said that the formula for allocation is based primarily on population with a bias towards lower potential districts and recently towards those that have a high rate of completion of RDF projects. The application for a project grant from the RDF is reproduced in Attachment 1 to this Annex.

35. Once completed the operation and maintenance of the RDF projects becomes the responsibility of the districts; the active support of the RDF stops when a completion certificate is issued. This has been a major problem. Almost all projects result to a greater or lesser extent in an increase in the recurrent cost responsibilities of government: responsibilities which the Government in its current budget crisis can rarely pick-up.

#### Performance and Impact

36. Types and Number of Projects. Since the inception of the Fund in 1974, about 4,300 RDF projects had been approved. Of these, over two-thirds have been completed, about 30% are still ongoing and about 3% or 120 projects have had to be abandoned, mostly those approved in the first six years of RDF operation. The table below summarizes the current position. The table following shows the allocations to RDF projects over the three year period 1982 to 1984. Out of the average annual expenditure of about Kenyan pounds 1.96 million (US\$2.4 million) annually the largest amount (26%) went to the Ministry of Agriculture and Livestock Development with most of the rest being divided between the Ministries of Environment and Natural Resources, Water Development, Transport and Communication, Health and Education - in almost equal amounts - 12% each. The type of projects which received the largest portion of the funds were: health centres and dispenserries (10%), secondary schools (10%), rural access roads (9%), cattle dips (9%) and village polytechniques (6%). However, the size of agricultural projects has tended to be small (Ksh 75,000) compared to the average

(Ksh 128,000). Almost as many Ministry of Agriculture and Livestock Development projects have been financed (45%) as those of the rest of the ministries combined; cattle dips alone, for example, have represented 20% of all projects supported.

RDF Projects

Financial Year	Ongoing	Completed	Abandoned	Total
1974/75	55	412	24	491
1975/76	95	570	25	690
1976/77	115	461	21	597
1977/78	17	70	12	99
1978/79	8	128	9	145
1979/80	39	242	12	293
1980/81	97	283	6	386
1981/82	64	243	5	312
1982/83	80	190	1	271
1983/84	109	127	1	237
1984/85	263	204	5	472
1985/86	289	5	0	294
1986/87	1	0	0	1
<b>Total</b>	<b>1,232</b>	<b>2,935</b>	<b>121</b>	<b>4,288</b>

Source: Rural Planning Division, MPND, RDF-Analysis System for Quarterly Reports.



RDF Allocations to Projects and Ministries

including the Famine Relief Programme, but excluding supplementaries

1/1 1982 - 31/12 1984

Projects & Ministries	Projects		Amt Allocated		Average Size
	No.	%	Ksh'000	%	
Cattle Dips	179	20	9,934	8.5	55,500
Poultry Projects	26	3	1,195	1.0	45,970
Pig Projects	3	0	395	0.3	131,747
Beekeeping	14	2	344	0.3	24,577
Other Livestock Projects	32	4	1,290	1.1	40,311
Agric. Crops & Horticulture	22	2	1,804	1.6	81,989
Irrig., Small Dams, Drainage	53	6	6,441	5.5	121,524
Fruit Tree Nurseries	12	1	1,400	1.2	116,744
Other Agric. Projects	66	7	7,529	6.5	114,068
MINISTRY OF AGRIC. & LIVESTOCK DEV.	407	45	30,332	26.0	74,526
Fish Ponds					
MINISTRY OF TOURISM & WILDLIFE	12	1	786	0.7	65,463
Tree Nurseries	52	6	6,135	5.3	117,982
Afforestation	55	6	6,944	5.9	126,252
Soil Conservation	19	2	1,474	1.3	77,579
Other MENR Projects	3	0	286	0.2	95,207
MINISTRY OF ENVIR. & NAT. RES.	129	14	14,839	12.7	115,028
Rural Water Supply					
MINISTRY OF WATER DEV.	90	10	14,672	12.6	163,026
Rural Access Roads	54	6	10,412	8.9	192,816
Bridges & Drifts	23	3	4,446	3.8	193,321
MINISTRY OF TRANSPORT & COMM.	77	9	14,858	12.7	192,967
Health Centres & Dispensaries	50	5	11,937	10.2	238,734
Rural Water Supply	24	3	2,517	2.2	104,878
MINISTRY OF HEALTH	74	8	14,454	12.4	195,321
Primary Schools	19	2	3,885	3.3	204,487
Secondary Schools	51	6	11,727	10.1	229,931
MINISTRY OF EDUCATION	70	8	15,612	13.4	223,025
Handicraft	12	1	1,972	1.7	164,342
Village Polytechnics	27	3	7,242	6.2	268,224
MINISTRY OF CULTURE AND S.S.	39	4	9,214	7.9	236,260
PROJECTS IN OTHER MINISTRIES	12	1	1,860	1.6	155,018
Total	910	100	116,627	100.0	128,161

Source: RDF Joint Evaluation Mission Report, April 1985

37. The RDF divides its projects into three categories: economic infrastructure projects, social infrastructure projects and production-oriented projects. The first two are essentially based on the two financing sources - the Rural Works Programme and District Development Grants - out of which the RDF was created. The third category has gradually taken on more importance but still in 1986 only represents about 26% of total new projects approved. In an analysis made of about 1,000 projects in eight districts <sup>1/</sup> by the 1985 Socio-Economic Impact Study, by far the most important category was the first economic infrastructure, which represented from 1974-84 77% of all project funding, with cattle dips and water supplies being most important followed by soil conservation and afforestation. Over the same period in the same eight districts, 17% was allocated to production-oriented projects - small-scale irrigation, crop development, pigs, goats and poultry, dairy, fish ponds and crafts - and 6% to social infrastructure projects (health and education).

38. Project Performance. The analysis of the performance of the economic infrastructure projects by the same Socio-Economic Impact Study team came up with the following conclusions:

- Water supply projects were accorded the highest priority not only in ASAL areas but throughout the country. This demand far exceeded the capacity of the Ministry of Water Development. Most projects came through local initiatives; self-help inputs were very important with women often being the major contributors. Simple shallow wells (without handpumps) were the most successful. Those requiring greater operation and maintenance inputs such as piped water schemes were problematic and only one half were operating successfully. Roof catchments, especially for schools, and dispensaries while being conceptually simple and attractive had major problems in quality of workmanship and in Wajir, for example, of the six that were constructed none are operational.
- Dams both for livestock and domestic water supplies are also popular with the people, especially in the pastoral areas, however, the success of these projects was found to be below expectations mainly due to incorrect siting, poor design and poor understanding of the staff of the labour-intensive construction methods being applied. In consequence, some of the dams collapsed with the first rains others did not hold sufficient water for the driest periods. The advisability of using dams in arid areas with the propensity for flash floods should be carefully assessed.
- Cattle dips would appear nationally to be the most sought after projects (20% of total projects) and second only to water projects in ASAL areas (16% of total projects). However, it is not at all clear if these projects are directly in response to beneficiary requests or are politically or line ministry motivated. In those areas where the number of grade cattle have been increasing there is strong evidence that there is community support and considerable self-help contribution. In other areas, including many of the ASAL districts, the construction period was often very extended (3 to 7 years) and little self-help input was forthcoming. Nevertheless,

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<sup>1/</sup> Machakos\*, Nyeri, Narok\*, Uasin Gishu, Kilifi\*, Wajir\*, South Nyanza, Kakamega. (\* = ASAL district).

the RDF Socio-Economic Impact study team found that once completed they were used and operated normally by a committee of local cattle owners. In those ASAL areas where the livestock system is basically nomadic removal of ticks by methods more cost-effective than dips is normally preferred.

- Afforestation and Tree Nurseries is an important input in many rural areas both in terms of soil conservation and fuelwood. About 12% of all projects financed were for these two activities (10% in ASAL areas), but similar to the dips, it is often, one can say almost always, an activity sponsored by the district line ministry staff not by the recipients. Even more problematic has been the operating of the nurseries once completed. The Ministry of Environment and Natural Resources (MENR) maintains the responsibility for running them and in the experience of RDF there has been an acute shortage of budget allocated to them. As the seedlings are either provided free or at a heavily subsidized price (98%), the operating deficit of the nurseries is substantial thus the Ministry is often forced to operate them well below capacity.
- Soil and Water Conservation Projects, particularly those involving terracing of large areas of marginal land, were found to be extremely successful, with major self-help contributions. Even after the termination of RDF funding, the terracing was seen to have been extended to adjoining areas through community initiated actions. In the ASAL areas, it is almost exclusively the transitional districts, in particular Machakos and Kitui, where these activities have been most prolific.

39. RDF has been attempting to decrease the proportion of infrastructure projects, which are seen to be technically complicated and to result in operation, maintenance and recurrent cost problems, and to increase the number of production-oriented projects, which were thought to be simple and require little direct government involvement in their operation and maintenance. The intention is to make the job of preparing and implementing projects easier and subsequently to reduce the technical support and recurrent cost commitments of government. To date, the transition has not been very successful. The Impact Study Team, in evaluating 40 production-oriented projects, came to the following conclusions:

- Irrigation Schemes while popular with the beneficiaries were observed to have run into major difficulties. This was particularly so for the pumped schemes. In a majority of cases the pumps had either broken down or there was no fuel and in spite of the aim to move to smaller simpler projects it was found that many irrigation schemes were very complicated to design and even more complicated to run. Greater success was found with the gravity schemes where the people were able to manage them themselves once installed. But in general the size of the schemes proposed was often too large requiring cofinancing and an extended implementation period (3 to 5 years) with the continued demand of line ministry and RDF staff. Furthermore the economic viability of most schemes was found to be dubious especially in areas where there was no ready market.
- Horticulture and Crop Production (not irrigated) Projects have had less problems than those above but the key to their success appears to have been a close working relationship between the groups and extension officers especially in the early years of production.

- Poultry, Pig and Goat Projects predominately initiated by women's groups, often with a strong involvement by the Ministry of Culture and Social Services (MCSS), have had major difficulties. In many cases there was inadequate preparation and appreciation of the complexity of such enterprises. The projects often failed after completion of the facilities and provision of the first batch of chickens or pigs. This could normally be traced back to a lack of technical backstopping from the Livestock Department. Goat schemes would appear to have had more success probably due to the people's greater familiarity with goats and their more ready acceptance into the farming/livestock economy and would also appear to have a good potential in ASAL areas.
- Other Production-Oriented Projects include zero-grazing dairy units, fish ponds and craft projects. Most have only limited application in ASAL areas due to distances involved and difficulties in marketing.

40. In general, it can be said that the overall performance of RDF production-oriented projects has been poor. Over 50% of those surveyed by the joint government/nordic Impact Study Team were outright failures and had been abandoned. In a majority of cases, the problem could be traced back to lack of technical support in project implementation and sometimes in project preparation. One of the main conclusions of the Impact Study Team is quoted verbatim below:

"The technological and managerial requirements of these projects should be commensurate with the locally available resources. Evidence suggests that even small-scale "low technology" projects are often complicated in view of the existing technical and organizational skills. Adequate preparation of the participants, through training and subsequent close supervision, could bridge the gap between available and required skills." <sup>1/</sup>

<sup>1/</sup> Chr. Michelson Institute, Kenya's Rural Development Fund. A Study of its Socio-Economic Impact, 1985 p.70.

It might be added that the social setting and traditional activities of the beneficiaries were often found to be as if not more important than the theoretical technical and economic viability of a project in terms of adoption and commitment, and thus success.

41. Project Processing, Completion and Follow-up. RDF recognized in the early years of implementation of the Fund that time required to process project applications through to project acceptance and approval was an inordinately lengthy one. It was not until after 1982 that the process was speeded up. The table which follows clearly illustrates the dramatic improvement between the 1974/82 period and that of 1982/85. Processing time was reduced from 40 months to 14.5 months. There are a number of reasons: (i) the District Focus Policy was introduced with its associated strengthening of district management and training of district staff, DDCs and in particular DDOs who are key to the processing of RDF applications; (ii) the staffing at the then Ministry of Finance and Planning was strengthened and an RDF advisor, recruited by DANIDA was hired and (iii) better application forms supplying more detailed project information were introduced.

Average Processing Time for Approval of RDF Applications (Months)

Periods	Recommand. DDC	Received PPO	Forwarded MF&P	Recommand. DDC	No. of
Years	Received PPO	Forwarded MF&P	Approved MF&P	Approved MF&P	Observ.
1974-79	14.0	0.5	4.0	18.5	30
1980-82	14.5	0.5	6.0	21.0	30
1983-85	3.5	1.0	2.5	7.5	29

Note: Based on a random sample of 89 RDF projects

Source: RDF Joint Evaluation Mission Report, April, 1985

42. A similar situation existed regarding the time required to complete projects. During the first five years of RDF the average time required to complete a project was 65 months, over five years. Not only did this tie up resources, but the concomitant inflation resulted in projects being underfunded. Furthermore, district staff had to continue to provide support and supervision of construction and administratively at all levels considerable additional effort had to be put in. Apart from the measures discussed in para. 41 above, the major change that was responsible for the marked improvement seen in the table below was the introduction into the project allocation formula of the performance of the district in terms of its rate of project completion. The time to completion was reduced to about one-third (23 months). However, it is acknowledged that this to a certain extent misrepresents the situation since districts sometimes ensure that an RDF project receives a project completion certificate even though in practical terms the project is not really completed or at least not fully operational. Another important improvement in project processing has been the better monitoring of projects which has been facilitated by the introduction of a computer based information system.

Average Implementation Time for Different RDF Projects (Months)

- defined as time for approval by MF&P to the issue of a complementation certificate

	1974-1979		1980-1985	
	Months	No. of Projects in sample	Months	No. of Projects in sample
Cattle Dips	79	19	19	25
Beekeeping, Pig & Poultry Projects	58.5	10	23	18
Agric. Crops & Horticulture	73	7	21.5	10
Afforestation	69	22	30	19
Rural Water Supply	65	25	22.5	22
Rural Access Roads	55.5	14	26	7
Health Projects	57	8	22	9

Note: Based on a random sample of RDF projects

Source: RDF Joint Evaluation Mission Report, April 1985

43. Project follow-up is one of the real problems with the RDF approach; it can be alleviated to some extent but not eliminated. RDF was set up and organized to help government plan and construct projects with the underlying assumption being that once completed, either the Government or the beneficiaries or a combination of the two would operate and maintain them. This has not happened because: (i) the line ministries, which are intended to operate and/or maintain the new facilities (schools, clinics, roads, etc.) in some cases have never really accepted that the new facilities are part of their regular operations and consequently do not budget for their operation and maintenance; (ii) the budget crisis of recent years has meant that projects that were formulated and initiated in the years of more liberal budgets, when ready for implementation, say five to six years later, could not be provided with sufficient budget to allow for efficient operation; and (iii) intrinsic nature of the RDF operation, administered through the MPND with no direct links nor support to the line ministries means that the RDF has no way of increasing the implementation capacity of the line ministries in the districts nor of assuring that there is adequate budget to support the projects financed by the Fund. This last factor eventually blocks the RDF from effectively improving the follow-up of its projects. The provision of 10% of project costs to be allocated to line ministries to help cover the cost of their staff supervising RDF projects is a step in the right direction but it is not effective as currently structured.

#### Future Orientations

44. RDF still sees its main role as to "fill gaps in the regular Government Investment Programme." In the last joint evaluation report (April 1985), five suggestions were made regarding the future role: (i) increased emphasis on revitalizing the large number of formally completed but not fully operational projects; (ii) to find a "lasting solution" to the financing of recurrent costs - the solutions proposed are to give priority to projects where no substantial recurrent cost burden is passed on to the ministries and to consider an RDF allocation for recurrent costs; and (iii) the DDO's Office should be strengthened. In addition, there is a strong orientation towards financing "small, low-technology production-oriented projects with the main emphasis on food production and generation of income."

#### Importance for ASAL Development

45. RDF has been generally an effective means of channelling funds for development to the district level and to the rural communities in these districts. This applies equally to ASAL districts as to higher potential districts and, perhaps even more effectively to ASAL districts because of the bias in the allocation formula towards medium to low potential areas. However, it has done so predominantly for infrastructure projects with domestic/cattle water (26%), cattle dips (17%) and roads and bridges (9%) being the most important. Soil conservation projects (8%) are the exception. Nevertheless, production-oriented projects have been few in number, as might be expected from the above discussion, (see table following).

46. RDF has been an important force in generating development where self-help is a substantial and essential component - a critical factor in ASAL areas where low population densities and limited government resources dictate a low investment, limited support services approach. The cost of individual line ministries providing "vertical" services on a regular and frequent basis is extremely costly in low density areas - the severe limitations on government operating funds further exacerbates the problem. Only when a number of support service officers can work together on for example a mini-project, pooling operating funds, can a sparse population be efficiently serviced. In addition, the fact of encouraging a "project approach" to development, to complement the normal line ministry "programme approach" is extremely valid for ASAL areas where commitment of the people to the project is essential. Only through this participatory approach can the investment costs be kept down and the people's commitment to maintenance be assured.

47. Finally, the RDF is the key tool at the disposal of the districts to implement the District Focus Policy and to respond to the projects demands generated by the Policy. If the funding of these micro-projects could be better brought into harmony with the districts' ability to plan, implement and backstop the projects the development process could be even more efficiently managed.

## KENYA

## ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

RDF Projects by Type in ASAL Areas - 1974 to 1986 a/

	AA1	AA2	AD	AE	AF1	AF2	AF3	AC	AK	BA1	BA2	BR	BD	BG	CB1	CR2/G8	ER/EC	ED/EI/EH	HBIA2	Others	Total
Mandero	0	0	7	3	0	2	5	10	6	2	13	0	0	0	1	37	3	8	6	0	103
Wajir	1	0	6	1	0	1	3	14	4	1	23	0	0	0	6	77	18	13	14	0	182
Garissa	0	0	20	1	0	1	4	5	3	1	22	0	0	0	7	26	5	8	12	1	115
Tana River	1	0	25	0	0	1	1	6	3	0	2	0	0	1	14	5	6	5	5	2	75
Lamu	2	1	3	0	0	0	2	8	10	0	3	0	0	0	5	20	3	2	8	3	70
Kilifi	4	2	5	5	0	0	3	14	5	0	5	3	0	0	0	13	5	7	4	1	76
Kwale	0	7	15	6	0	6	5	3	1	2	3	1	0	1	3	13	4	3	1	1	75
Taita-Taveta	0	0	5	2	0	0	0	4	1	2	2	0	0	0	2	11	2	4	11	0	46
Kajiado	0	2	12	0	0	0	1	10	1	4	7	0	0	0	2	14	3	3	3	0	62
Narok	0	0	3	4	1	0	1	25	4	4	1	0	0	0	3	5	3	3	9	4	70
Hachakos	3	0	1	13	0	0	0	18	2	2	8	4	0	0	4	85	4	0	3	2	149
Kitui b/					51										15	72	3	3	11	1	162
Eoba b/					57							6			9	21	1	9	11	0	134
Mera	2	0	3	0	0	2	0	20	9	7	18	6	0	3	1	39	1	0	40	1	152
Isiolo b/					25							11			1	11	1	4	7	0	60
Samburu	0	0	2	2	0	1	0	6	9	3	9	1	0	0	4	7	1	7	4	3	59
Marsabit b/					11							21			8	29	4	4	2	0	79
Turkana	0	0	1	1	0	0	0	19	0	3	6	0	0	0	0	4	0	2	0	0	35
W. Pokot	0	0	2	6	0	0	0	15	1	6	4	0	0	0	0	8	0	10	2	0	54
Elgeyo-	0	0	11	5	0	0	0	45	3	0	8	0	0	0	3	8	16	3	0	0	102
Marakwet	0	3	8	0	0	0	0	40	1	0	2	0	0	0	0	5	2	5	5	0	71
Liatipia	0	0	4	0	0	0	5	23	1	2	2	6	0	0	1	9	0	3	14	1	70
Total	13	15	133	49	1	14	30	285	64	39	138	21	0	5	89	518	85	106	172	20	2,001
Average	0.7	0.8	7.4	2.7	0.1	0.8	1.7	15.8	3.5	2.2	7.7	1.2	-	0.3	4.1	23.6	3.9	4.8	7.8	0.9	91.0
Percent of all projects	1	1	8	3	-	1	2	17	4	3	9	1	-	-	5	26	4	5	9	1	100



Footnotes

a/

RDF - Project Coding System

Type of Project	Code No.	Type of Project	Code No.
M.O.A. & L.D.		M.O.H.	
Agricultural Crops		Health Centres & Dispensaries	CB1
Horticulture	AA1	M.O.H. Water Projects	CB2
Seed Bulking			
Fruit Tree Nurseries	AA2	M.O.E.S. & T	
Drainage		Primary Schools	EB
Irrigation	AD	Secondary Schools	EC
Dams			
Soil Conservation	AE	M.O.C. & S.S.	
Pig Projects	AF1	Village Polytechnics	ED
Beekeeping	AF2	Handicraft & Women Groups	EJ
Poultry Projects	AF3	Other M.O.C. & S.S. Projects	EH
Cattle Dip & Cattle Crushes	AG	M.O.W.D.	
Other M.O.A.L.D. Projects	AK	Rural Water Supply	GB
M.O.E. & N.R.		M.O.T. & C.	
Tree Nurseries	BA1	Roads	HB1
Afforestation	BA2	Bridges & Drifts	HB2
Fish Ponds & Fish Landing Depots	BB	Other Project Types	NA
Soil Conservation	BD		
Gully Filling		! DIRECTORY OF SECTORAL CLASSIFICATION	
Other M.O.E. & N.R. Projects	BG		

b/ Breakdown of MALD and MENR project was not available.

C. District Development Initiatives - The EEC Micro-Project Funds

48. The Micro-Project Fund financed by the European Economic Community (EEC-MPF) which essentially operates in parallel with the RDF has been functioning since 1977/78. It is much more limited in scope than the RDF and follows very much along the lines of EEC Micro-Project Funds in other countries. They are intended to respond to the felt needs of the people in rural areas using self-help participation as an essential ingredient. The financing formula below illustrates this.

	<u>% of Project Financing</u>
EEC	50
Self-help contribution	25
Government contribution	25

49. The funds are available in principle for any projects proposed by the district to the EEC Micro-Project office in the Ministry of Planning and National Development (MPND) in Nairobi. However, to date the funds have gone almost totally for rural infrastructure projects. The table below shows that about 90% of the funding is for schools, water supplies, health centres and roads and bridges. About 6% goes for irrigation schemes and 5% for cattle dips and other projects most of which are production-oriented. In the ASAL areas, slightly more production-oriented projects (16%) have been financed. Surprisingly, less water supply projects have been financed in ASAL areas (24%) as compared to higher potential districts (35%). But in both low and high potential areas, schools and other educational facilities have taken over half of the available resources.

## EEC MICRO PROJECTS - 1977/78 to 1986/87

Districts	a/ Schools	Water Supplies	Health Centres	Roads & Bridges	Irriga- tion	Cattle dips	b/ Others	Total	Total Cost	Average Cost
									(Ksh '000)	
<u>ASAL</u>										
Majir	2	1	-	-	-	-	-	3	3,358	1,119
Handera	1	-	-	-	2	-	-	3	2,714	905
Garissa	2	-	-	-	-	-	-	2	1,700	850
Tana River	2	1	-	-	-	-	-	3	3,500	1,167
Lamer	1	-	-	-	-	-	1	2	2,310	1,155
Kilifi	2	-	1	-	-	-	-	3	2,950	983
Kwale	1	1	-	1	-	-	-	3	2,750	917
Taita Taveta	1	-	-	1	1	-	-	3	3,500	1,167
Kajiardo	1	2	-	1	-	-	-	3	5,256	1,752
Marok	2	1	-	-	-	-	-	3	3,111	1,037
Machakos	2	-	-	-	-	-	1	3	3,260	1,087
Kitui	1	3	-	-	-	-	-	4	5,410	1,352
Embu	1	1	-	-	1	1 c/	-	4	5,080	1,270
Meru	2	2	-	-	-	-	-	8	5,410	676
Isiolo	1	-	-	-	2	-	-	3	3,650	1,217
Samburu	2	-	-	-	-	-	-	2	1,500	750
Marsabit	2	-	-	-	-	-	1	3	3,235	1,078
Turkana	2	1	-	-	-	-	-	3	2,450	817
W. Pokot	1	1	-	-	1	-	-	3	2,250	750
Baringo	4	-	1	-	-	-	-	5	8,160	1,632
Elgeyo Marakwet	2	-	1	-	-	-	-	3	3,590	1,197
Laikipia	-	2	-	-	-	-	-	2	3,650	1,825
Sub-total	35	16	3	3	7	1	3	68	78,794	1,159
%	52	24	4	4	10	2	4	100		
<u>OTHER DISTRICTS</u>										
Kiambu	1	2	1	-	-	-	-	3	4,015	1,338
Kirinyaga	2	1	-	-	-	-	1	4	3,997	999
Muranga	1	2	-	-	-	-	1	4	4,091	1,023
Nyandarua	1	3	-	-	-	-	-	4	5,080	1,270
Nyeri	1	3	-	-	1	-	-	5	6,560	1,312
Kisii	3	-	-	-	-	-	-	3	2,430	810
Kisumu	-	2	1	-	-	-	-	3	3,420	1,140
Siaya	1	2	-	-	-	-	-	3	9,492	3,164
S. Nyanza	3	1	-	-	-	-	-	4	5,110	1,278
Sungama	2	-	1	-	-	-	-	3	3,150	1,050
Busia	2	-	1	-	-	-	-	3	2,340	780
Kakamega	3	-	-	-	-	-	-	3	3,111	1,037
Kericho	2	1	-	-	-	-	-	3	3,555	1,185
Nakuru	2	1	-	-	-	-	-	3	3,555	1,185
Nandi	2	2	-	-	-	-	-	4	4,115	1,029
Trans Nzoia	-	2	1	-	-	-	-	3	3,060	1,020
Uasin Gishu	1	1	1	-	-	-	-	3	2,250	750
Mombasa	3	-	-	-	-	-	-	3	3,550	1,185
Nairobi	3	-	-	-	-	-	-	3	620	207
Sub-total	33	23	6	-	1	-	2	65	70,501	1,085
%	51	35	9	-	2	-	3	100		
Total	68	39	9	3	8	2	5	133	149,295	1,123
%	51	29	7	2	6	3	4	100		

a/ Including polytechniques and training centres implemented by MCSS.

b/ Free nurseries (1), beekeeping (1), fisheries (2), childrens home (1).

c/ Covered construction of 21 cattle dips.

50. The size of projects has followed a very consistent trend. In the first year of operation it averaged below Ksh 1.2 million (of which 50% EEC contribution). It rose to Ksh 1.3 million by 1978/79, Ksh 1.4 million by 1979/80 and finally to about Ksh 4 million by 1986/87.

	EEC Tranche	Projects Financed		Average Size (Ksh millions)
		No.	Total Cost (Ksh millions)	
1977/78	I	9	10.3	1.15
1978/79	II	5	24.9	1.31
1979/80	III	8	11.5	1.44
1980/81	IV	12	17.3	1.45
1981/82	V	20	33.4	1.67
1982/83	VI	20	34.6	1.73
1984/85	VII	21	63.8	3.04
1986/87	VIII	24	101.0	4.21

51. If inflation over the period is assumed to average about 15% the size of project has remained more or less constant. In fact, in the last couple of years, the EEC allocation per project has in the majority of cases been a fixed amount regardless of the project - Ksh 2 million in 1986/87 and Ksh 1.66 million in 1985/86. As the processing of project applications is very slow, often taking over two years, these might be representative allocations used until final project costs are known. The average size and spread of projects is considerably different than those of RDF. At present, RDF still has an upper limit of Ksh 600,000, as compared to EEC's Ksh 4 million. The number of projects financed in the past few years has averaged 20 per year: in other words one project per district every two years. By comparison, the number of projects financed by RDF in recent years has been about 300.

52. Administratively, the EEC micro-projects come through the same basic process as those of RDF. In principle, it is the district's different levels of development committees that identify the need and subsequently the project and recommend it to the DDC for financing. The District Commissioner together with the DDO decides which projects to submit for RDF funding and which for EEC funding. However, as the EEC-MPF has a much higher upper limit, the projects proposed to the EEC-MPF are practically always the largest ones. This is one of the main reasons that very few production-oriented projects, which tend to be less expensive, are presented for financing to the EEC-MPF. Irrigation schemes are the main exception.

53. Unlike the RDF, the EEC-MPF has very few staff dedicated exclusively to planning, processing and monitoring projects. There are three engineers and two planning officers at MPND headquarters supported by two expatriate engineers. There are no staff posted to the field. No major changes are anticipated in the running of the EEC Fund in the near future. Thus it can be assumed that the orientation toward larger infrastructure projects will be maintained and that there will be no particular bias that would treat ASAL districts in a different way from districts in the rest of the country. As such it will remain an important but limited development activity at the disposal of the DC and DDO but one that is not able to respond to the multitude of small micro-project requests coming up through the district's development committee network.

#### D. ASAL Development Fund

##### Present Situation - Key Elements

54. Based on the analysis in previous sections, the following discussion will highlight the key points relevant to the introduction of a district development fund for the ASAL areas and will establish the working assumptions upon which it would be based.

55. The district and the District Focus Policy will be key to this new initiative. The main factors are the following:

- the District Focus Policy and its related planning initiatives are now starting to generate a large number of project requests - many more than can be satisfied by the current funding available to the district;
- many of these project proposals, which have often received limited preparation and little costing, come not from the people but from line ministry staff in the district - this is partially a result of inadequate training of the Locational and Sub-Locational Development Committees, partially of lack of understanding of the interactive nature of "bottom-up" planning and partially the natural tendency of technical staff to promote their own project ideas;
- the current planning (and follow-up) capacity of the districts is too limited to meet the requirements of the District Focus Policy, however, it is proposed to strengthen it by recruiting an Assistant DDO, a District Statistical Officer and an engineer to be formed into a District Planning Unit; the complementary introduction of sound management and information systems backed up by practical training will help remove the current constraint;
- the Provincial Planning Unit, which is currently also understaffed, must play a critical role in the monitoring, evaluation and coordination of this micro-project-oriented development; this is recognized by Government and it is proposed to strengthen it;
- the line ministries at district level in essence still operate "vertically" in spite of the emphasis of the District Focus Policy - their budgets even if disaggregated by district are controlled from Nairobi and the staff report through the District Department Head to the ministry headquarters in Nairobi; consequently, the DC/DDO must in effect respond to line ministry development proposals rather than letting the people through the districts development committee system participate in initiating them; this situation will not change until the DC/DDO have sufficient budget directly under their control to allocate to financing project proposals;
- the budget constraints currently experienced in Kenya and even more acutely experienced in the ASAL districts mean that line ministry staff get their salaries paid, but have virtually no operating funds; because of the low population densities, the current orientation towards development of the higher potential areas (Session Paper No. 1, 1986) and the difficulty and high cost of serving the ASAL areas, this situation can not be expected to change in the foreseeable future;

- line ministry support services based on frequent and regular visits in support of regular programmes are not economically justified in the sparsely populated ASAL areas; a more focused approach in response to clear needs and well defined requests for support, from the people, as in micro-project implementation, would make better use of limited resources; and
- the past proposals for district development funds have concentrated on a transfer of votes from line ministries to the district to be at the discretion of the DDC for all district specific projects; although the basic concept of a district development fund is looked on favourably by the Government, to date no progress has been made in introducing the idea defined above.

56. The two financing sources available to the district, the RDF and EEC-MPF, have facilitated support for district-initiated and district specific projects. The major elements affecting their operation which in turn shed light on the introduction of a new district-based ASAL development fund are the following:

- the RDF which most closely approximates a district development fund (the EEC-MPF only finances one project per district every two years) is proposed by Government to remain an independent fund with external financial and technical support coming essentially from the nordic countries; as such Government has stated that it does not wish RDF to become "the District Development Fund" nor does it wish it to be greatly expanded through injection of funds from other donors - a wish fully supported by the nordic countries themselves;
- the EEC-MPF, supported by only one donor, does not have currently nor is it foreseen to have the mechanism nor the scope to be anything more than a window for funds available to finance a limited number of district initiated projects;
- both funds are predominantly oriented and structured to finance rural infrastructure projects; although RDF has always attempted to support an increased number of production-oriented projects - particularly recently - it has been relatively unsuccessful both in generating production-oriented projects to finance and in implementing those which have been approved;
- the key reasons for the failure to incorporate within RDF's portfolio a higher percent of production-oriented projects are (i) the natural tendency for the people to request financing for schools, clinics, etc. in absense of readily recognizable and understandable project approaches to improved crop or animal production, (ii) the shortage, particularly in ASAL areas, of demonstrated and "packaged" technical solutions/projects to improve production, and (iii) the structural inability for RDF to appreciably influence the generation of productive-oriented project proposals and the subsequent implementation of those projects;
- the main constraint blocking the expansion of RDF activities has not been a lack of funds but a lack of preparation and implementation capacity within the line ministries at the district level; RDF as constituted cannot directly influence this capacity as it has no budget nor technical mandate to do so;

- the bias of RDF and particularly EEC-MPF is to finance increasing larger micro-projects, a natural tendency if only a few projects can be supported each year; thus many worthwhile but less prominent projects, especially production projects are passed by; and
- both RDF and EEC-MPF financing is provided totally on a grant basis; while this could be considered as a viable alternative means of channelling government development support (to using the channel of regular line ministry programmes), in the longer run, particularly if donor support is reduced, some form of cost recovery or credit mechanism will need to be incorporated.

57. Apart from the RDF and EEC-RDF the only other important sources of micro-project finance at the district level are the non-governmental organizations (NGOs). The constraints and potentials of NGOs as they relate to district development are discussed below:

- there are hundreds of NGOs working very much independently from each other and from the Government which represent a large resource of inexpensive and motivated grass root technical assistance (TA), ideal for ASAL areas where the thin population densities dictate a low investment, high TA/self-help approach;
- the difficulty for Government is that the non-interference attitude of the NGOs means that their inputs whether good or bad are not all in unison with government policies or objectives, except by coincidence; there is little coordination and often a general reluctance to be coordinated; and
- although many NGO projects are very valuable and provide practical experimental approaches to community level development there is little spread beyond the community assisted and no mechanism to allow the positive results to be replicated.

58. What is necessary is a means to allow the truly beneficial NGO projects to be continued or expanded or introduced to new communities; to do this funds would be needed to pay the TA and support the continuation of those NGOs activities; this should in turn lead to better coordination of NGOs at the district level.

#### Rationale and Objectives

59. The prime intention of the proposed ASAL Development fund is to establish a financing facility at the district level that will respond specifically to the needs of the people in the ASAL areas within the framework of the government system. As such it must be a sustainable facility which while welcoming donor support and contributions will be financed through the regular government budget and managed by government staff at the district level with complementary support from the provincial and headquarters levels. Even though the RDF and EEC-MPF to an extent meet part of this requirement, they are not fully integrated into the government system and do not provide a flexible enough mechanism through which support from different donors can be channelled, a prerequisite which is particularly important in the ASAL areas where the main means available up to now for allocation of external development assistance to these districts has been area specific development projects normally focused on one district or even one division.

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60. For such a financing facility to respond not only to the perceived needs of the people but also to the longer-term development and food security needs of ASAL districts, it must be strongly biased towards production-oriented projects. But not exclusively to production-oriented projects, in many instances infrastructure projects are the first priority of an area and often result in labour savings (more reliable and closer drinking water) or improved health (clinics and cattle dips) which will directly or indirectly result in improved productivity. However, the ability of a fund to respond to production-oriented projects serves no purpose unless the projects are there, the people are requesting financial support to implement them and the technical capacity of the line ministry personnel can be channelled effectively to support their implementation and subsequently provide technical backstopping during the first years of operation. To meet this and the other requirements, the establishment of the proposed ASAL Development Fund would include, through a separate financing facility, complementary budgetary support for the line ministries both at headquarters and district levels to help pull together technical solutions for ASAL areas, analyse them as to their adaptability and suitability for introduction to other ASAL areas and thereafter help to introduce them to the appropriate districts either as field tested development proposals to be discussed with communities for adoption or, what will be most common, for demonstration and later adoption. This is discussed in detail in Annex --.

No

Yes

61. If the Fund is to be sustainable, it will be necessary to determine in what areas some cost recovery could be possible. There would appear to be no obvious answers to this question. In most cases, the completion of a micro-project if provided as a grant would not generate any additional government revenue to help offset the expenditure. The creation of new levies or taxes to help raise revenue would probably not be favourably received by Government and would probably be difficult to collect if introduced. The only avenue for cost recovery which might have a chance is cost sharing through (i) self-help contributions such as labour, which are already common and would be an essential prerequisite to any ASAL development, (ii) cash contributions possibly in the form of savings, and/or (iii) credit to finance in part certain appropriate projects. The latter two are very problematic. Many of the people in these areas are poor, certainly cash poor, however, it has been found that when something is valued highly enough, considerable savings can be generated. As for credit, smallholder credit has had a dismal record in Kenya except in a few limited circumstances. Thus no clear orientation is apparent, however, the attractiveness of incorporating credit, probably combined with savings, for certain projects with direct or indirect income-generating potential warrants further discussion and study. Annex 6 provides some of the options.

62. The operation of the Fund itself would follow similar lines to that of the RDF, with the district through the DC and the District Planning Unit (DPU) carrying the main responsibility. The system of development committees in the districts (DDC, DVDC, LDC and SLDC) would be the prime channel to represent the people's felt needs and together with the line ministries and the DPU, the means to determine project priority in relation to available resources - both in terms of technical support available in the district departments and funds available to the district for the coming year(s). The Provincial Planning Units would fulfil the role of monitoring and evaluation, a role which is consistent with their mandate in conjunction with the District Focus Policy and the same role they perform for RDF.



63. In summary, the objectives of the ASAL Fund are to:
- capitalize on the untapped potential in ASAL areas primarily by facilitating increased food security through promotion of more reliable crop production and more productive livestock rearing - both largely dependent on increased water/moisture availability;
  - help improve the efficiency of the utilization of Government's limited budgetary resources for ASAL districts through more effectively directed technical and financial support for local development initiatives; and
  - establish a viable alternative channel (to area development projects) for allocation of donor funds to ASAL areas while at the same time providing a mechanism for absorbing and spreading the better technical/institutional solutions proven in the separate ASAL area development projects.

#### Investment Components

64. The operation of the Fund requires the provision of investment for a number of diverse purposes; these can be grouped into four categories: project financing, budget support, supporting equipment and materials and training/technical assistance. These components are described briefly below; their operation is discussed in a following section, Organization and Management (paras. 77 to 85 ). These components only cover investments related to operation of the ASAL Fund; support for the line ministries to demonstrate technical/institutional solutions and increase district implementation capacity is described in the Main Report.

65. Project Financing. The ASAL Development Fund would contain a number of windows for financing different development initiatives normally in the form of micro-projects. At the moment three possible windows have been identified. The first and the major one, would be the funding of diverse micro-projects which have come up through the districts' development committees and have been put forward by the DC/DDO/DDC. These micro-projects, which would basically conform to an approved list of projects demonstrated to represent viable solutions to technical constraints, would be predominantly production-oriented, and in most cases, water would be the catalyst. The number of projects that a district could support each year would depend on the improvement in their implementation capacity and on the performance of previous projects. These funds would be provided to the people on a grant basis, generally in kind, and would require a major participation by the beneficiaries in terms of self-help (labour) and in certain projects, cash. The precise formula(e) would have to be determined at the time of preparation.

66. The second window would facilitate the continuation, expansion and replication of successful NGO projects which meet the District's and Government's development objectives. These projects, would probably of a similar nature to those above and be predominantly production-oriented. Through this injection of funds, the maximum advantage could be made of the low cost NGO technical support staff who would already have gained considerable experience in the area. As many NGOs would be unable to carry on or expand their activities due to shortage of funds or commitment of limited funds to other areas and projects, it is anticipated that this source of financing would also be attractive to the NGOs.

Alternative  
Loans  
through  
Banking  
System  
for areas  
in ASAL  
Branches

67. The third window could be for financing off-farm income-generating projects. These range from brick making to local handicrafts, from maize mills to farm supply inventories. Funds would be made available on a combination grant/credit basis with credit generally playing the most important role. Credit is discussed in the section below as well as in Annex 6. Non-farm income-generating activities and the potential for providing financial support for the sector are discussed in Annex 10.

Yes  
AFC  
ASAL  
Support

68. Credit while not a separate window but in reality part of the other two (the first and the third), does nevertheless require separate administration. In all likelihood, credit would have to be channelled through a different institution (from the ASAL Fund), such as the Agricultural Finance Corporation (AFC), with the ASAL Fund providing the main liaison between the credit operation and the grant operation which would be managed by the Fund.

69. Budget Support. Financing in the form of budget support would be necessary in two senses. The first would involve the traditional allocation of funds, either from government revenues or external donor resources or both, to meet the financial commitments of programme expenditure. In other words, it would be support for recurrent cost expenditures of government departments. Incremental operating costs and to a limited extent additional staff costs would be incurred at district, provincial and headquarters levels to ensure the smooth operation of the Fund. Fuel, nights out allowances and associated incremental operational expenditures would be incurred by the District Planning Unit and Provincial Planning Office to ensure mobility in meeting the planning and monitoring and evaluation demands of the Fund. The Government already has plans to hire additional staff for these units (paras. 79 and 80). At the national level, additional staff would need to be recruited, totally dedicated to Fund operations, to manage a small ASAL Fund management unit (para. 78). Budget support would be required to cover fully the operations of this unit. The channelling of these resources would be through MPND/OP budget heads.

NO

70. The second type of budget support is less common, it would require the availability of funds to be at the discretion of the ASAL Fund in order to cover the incremental recurrent cost expenditures necessary to meet the preparation and support service demands of the district line ministry staff in processing and backstopping the micro-projects supported by the ASAL Fund. It would thus require the creation of a line item in the development estimates under MPND or OP. It is still an open question whether this provision should come under the budget of MPND or OP. A similar question arises over the allocation of finance to the Fund itself.

Yes but  
allocation  
at district

71. Materials and Equipment. At the district, provincial and headquarters levels, there would be a need for additional vehicles and equipment; micro-computers might be considered for the information systems at provincial and headquarters levels in MPND. Other materials to facilitate the efficient operation of the officers should also be considered.

Yes

72. Training and Technical Assistance. This is a key area where considerable work is already being done under the District Focus Policy, work which would greatly benefit the execution of the ASAL Fund and the strengthening of the district staff and district's various development committees. This training would be supplemented where necessary by technical assistance which would not only provide training but would also help the Government design the management systems, test them and introduce them.

NO

Districts - Group Infrastructure  $20 \times 6,000 = 120,000$  - but not general shops. Annual  
 Districts - Multicon - Rural Industries  $50 \times 6,600 = 330,000$   
 Commercial Feasibility by Banks agencies - DDC  
 Financing and Phasing  
 Support DDC Comm. Bank  
 Total per district 2540,000  
 Total Country  $\times 22 = \text{US\$ } 11,880,000$   
 450,000  
 90,000  
 ANNEX 4  
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73. The ASAL Development Fund is intended to be a regular part of the government budgetary system and as such would require that the Government be a major contributor and eventually the major contributor. In the first years, donors might contribute a higher proportion of the finances than government but this portion should gradually be phased down to a sustainable level - it is anticipated that there will probably always be a certain amount of donor financing earmarked for the ASAL areas that could be available for commitment to the Fund.

Support  
 Group  
 Rural Industry  
 DDC  
 ASAL  
 Infrastructure - Multicon

74. The size of the Fund is practically impossible to determine at this time. It would depend, however, on a number of factors: the requests by the people for projects that are implementable, the availability of proven technical solutions/packages to respond to these demands, the capacity of the planning mechanisms at the district (and provincial) level to handle the proposals and the implementation/backstopping capacity of the district line ministries. If one starts with the RDF figure of 30 projects per district per year, it could be assumed that a combination of demonstrations, technical inputs and budget support provided through the ASAL Programme would initially generate the capacity to handle an additional 15 to 20 projects per district per year. If these are assumed to be small production-oriented projects averaging Ksh 100,000 (US\$6,000) each, the project financing required per district would be Ksh 1.5 to 2.0 million (about US\$100,000) annually. If one adds three NGO projects of say Ksh 500,000 each (US\$30,000) and 10 non-farm income-generating projects of Ksh 100,000 (US\$6,000) each, the total of the three would be about Ksh 4.5 million (US\$300,000) annually per district. If 20% is added for direct budget support to help the line ministries service the projects, the total per district including training and technical assistance would be about Ksh 5.4 million (US\$350,000) annually.

75. The phasing of the Fund's activities must allow for an initial period of introduction of management systems and procedures and the associated training while at the same time initiating project support on a limited and manageable scale. A pilot period of four years is proposed with the introduction of the Fund into five ASAL districts. This would result in an investment for this first phase of about Ksh 80 million (US\$5 million), if it is assumed that the first year is a preparatory one and that projects are only supported in years two, three and four.

76. For a programme of this nature to become effective, a development period of ten to twelve years should be envisaged with two to the three phases and various tranches of financing. By the time that all 22 districts have the ASAL Fund fully operational in their areas, it could be envisaged that the financial requirements of the fund could easily reach over US\$10 million annually.

E. Organization and Management

77. Responsibilities. The Ministry of Planning and National Development (MPND) in close cooperation with the Office of the President (OP) would be responsible for the ASAL Development Fund. A special unit probably coming under the ASAL coordinator would need to be established in Nairobi with a small team composed of professional officers whose main responsibilities would be to help match the project requests from districts to the performance and capacity of the districts and the financial resources available to the Fund that year. Their second main responsibility would be

in monitoring the planning, preparation, implementation and initial operation of the projects and their impact on recurrent costs. Their third responsibility would be that of inspection and audit and would necessitate the formation of a small sub-unit with the capacity to regularly visit the different ASAL districts.

78. At the provincial level, the Provincial Planning Officer would be responsible. No additional staff specifically hired to support the activities of the ASAL Fund are envisaged, however, the strengthening proposed to help the province to fulfil better its general mandate for monitoring and evaluation would also be helpful to its activities in support of the ASAL Fund.

79. Again, at the district level, no specific ASAL Fund staff are envisaged. The planning, preparation, implementation, budgeting, etc. would again be the responsibility of the respective district department. The key responsibility would lie with the District Development Officer (DDO) who is part of the DP establishment but technically operates as part of MPND, but as he is already overloaded it is imperative that the planned strengthening of the District Planning Unit (DPU) go ahead if the additional demands of an ASAL Fund are to be met. The responsibility for technically evaluating projects, for detailed project preparation, support for project implementation and backstopping during initial project operation would be the responsibility of the respective line ministry.

80. Project Approval Process. This would be similar to that used by the RDF (para. 32) and would essentially follow the District Focus Policy means of identifying and prioritizing projects through the development committee system. However, the system needs refining and strengthening in two ways: first, the people's needs and wishes must be passed up the line, not those of the government staff; and second, the process must become more interactive in a systematic way so the people are involved in the refining of a basic idea into a project possibility, then into a viable and implementable project with the concomitant support required from the beneficiaries themselves both in terms of labour and in some cases money.

81. NGO Projects. Proposals from NGOs or to NGOs would be processed by the District Executive Committee for technical and economic merit and approved or rejected by the DDC in line with the development goals of the district. The province and the MPND headquarters would be required to review these proposals once approved by the DDC to ascertain that they conform to regional and national priorities and policies. Once approved for financing the district would be authorized to make funds available through the ASAL Fund. However, a difficulty lies in the means to channel the finance from the ASAL Fund, i.e. the Government, to the NGO and subsequently how to ensure its accountability. At present, no obvious mechanism exists except for perhaps a services contract between the Fund and the NGO which, in principle, would necessitate going to tender and then requiring more than one quote. This remains an issue that will have to be discussed prior to preparation. 24

82. Credit. There is no credit institution at present that is active in the ASAL areas. In fact, very few institutions even have representations in these areas. The private banks are poorly represented, have little lending to the agricultural sector and almost no lending to the smallholder sector. The Kenya Cooperative Bank has numerous credit schemes, over 20, but apart from the Cooperative Savings and Credit Project, they have little application to the problems of people in the ASAL areas. Furthermore, as this scheme requires that the recipients be members of a cooperative or pre-cooperative society, the majority of potential recipients with projects

submitted for financing to the ASAL Fund would not qualify. That leaves the Agricultural Finance Corporation (AFC), which does lend to smallholders and livestock owners and does have branches in ASAL districts - 24 in total. However, at present, apart from the loans for group ranches under the World Bank financed Livestock IV Project, very little has been lent to ASAL areas. Discussions with AFC management indicated an interest and willingness to explore the possibilities of developing a capacity to respond to the credit requirements of an ASAL Fund.

83. As collateral would be a major constraint to any credit programme, a combination savings/credit scheme would probably have the best chances of success. AFC is at a disadvantage here as it does not have at present a mandate to accept savings nor run a savings scheme. This is, however, currently under consideration and there should be a decision by the end of 1987 as to its possible acceptance.

84. Budget Support. The provision of financing at the discretion of the ASAL Fund for allocation to district line ministry departments (para. 70) is a relatively new approach with important implications. It is currently being tried by RDF but with limited success due primarily to difficulty in controlling the use of funds. The RDF increases project cost estimates 10% to provide funds for the mobility to those line ministry personnel that prepare or supervise construction of RDF projects. However, the application of these funds to the specific purposes intended, the planning and preparation of RDF projects, is not always what it might be. Nevertheless, the measure is a necessary one if the technical support of the line ministries is to be guaranteed. At present, in most ASAL districts, the field staff have next to no recurrent budgets to allow them to go into the field. As these projects represent a concrete and defined development action to meet a recognized need allocation of budget to support them represents an efficient utilization of funds. However, the ongoing commitments of line ministries, normally dictated from Nairobi, sometimes do not always respond to the priorities in the districts. Consequently, to ensure successful operation of the ASAL Fund, it is proposed that sufficient provision be made to give the line ministries the ability to fully respond to the requirements of these projects and that a mechanism be developed which ensures that the funds are earmarked exclusively for the use of these staff in pursuance of this supporting role..

85. Training and Technical Assistance. A major part of the basic training at the district level required for the ASAL Fund to operate efficiently is an ongoing responsibility of the District Focus Training Programme (paras. 12-16). The main area for incremental training will be in the management and operation of the ASAL Fund. Technical assistance would be required to fulfil this role, but, at this time it is impossible to determine exactly what experts would be necessary and for how long. Nevertheless, the bias should be to recruit short-term experts whenever possible as experience has shown that the terms of reference for the expert can be more precisely set, the most appropriate experts can be selected and the work more effectively undertaken. This approach also avoids the problem of expatriates assuming line functions instead of the advisory and training functions which they should be fulfilling.

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

MINISTRY OF PLANNING AND NATIONAL DEVELOPMENT TREASURY BUILDING

P.O. BOX 30005

MP&ND/SC 237/016 (2)

SERIAL NO. ....

(To be indicated by the Ministry Headquarters)

APPLICATION FOR A GRANT FROM RURAL DEVELOPMENT FUND (DDG/RMP)\*

(To be prepared in original and six copies. Paragraphs not applicable to be marked N/A)

1. Name of Project .....

2. Location of Project

- (i) Province .....
- (ii) District .....
- (iii) Division .....
- (iv) Location .....
- (v) Sub-Location (s) .....

3. Date of recommendation by the D.D.C. (Give reference No. if the project is included in the approved District Plan).  
.....

4. If extension/completion of an existing project, indicate what is already established.  
.....  
.....

5. If application is for a supplementary grant, indicate for previous grant(s)

A.I.E. No. ....

Original grant:	Date	Allocation
1. Supplementary:	Date	Allocation
2. Supplementary:	Date	Allocation
3. Supplementary:	Date	Allocation

Total Allocation .....

Balance to-date .....

\* Delete as necessary

6. What is it intended to establish now?  
.....  
.....
7. Which benefits will the project provide?  
.....  
.....
8. Cost of materials  
(List of materials with quantities and prices must be attached)  
.....  
..... Kshs.....
9. Transport  
(Distance between rproject site and main supplies is km .....)  
.....Kshs.....
10. Price Increases .....Kshs.....
11. Total materials-related to costs (8+9+10) Kshs.....
12. Cost of labour (see schedule of labour)  
a) Skilled Kshs .....  
b) Unskilled Kshs .....  
a+b Kshs .....
13. Overall cost (11+12) Kshs .....
14. Self-help contribution (DDG projects only)  
Labour Kshs .....  
Materials Kshs .....  
Cash\* Kshs .....  
Total Kshs .....
15. Project Cost Kshs .....
- (For DDG Projects = (13-14)  
(For RWP Projects = 13

\* Has the cash contribution been despoited in a bank account?  
Yes/No

Projects with deposits in a bank account will be given priority.

16. Ministerial allowance 10% of 15 Kshs .....  
(For supplementary only 5% of 15)
17. Amount applied for (15\*16) (rounded) =====
18. Labour/Total cost proportion (RWP projects only)  
12 as percent of 13-10 .....%
19. Cost of equipment to be acquired under the  
Appropriation-in-aid programme .....  
(for details see appendix)
20. What will be the annual recurrent costs-if any  
of operating and maintaining the project?
- Labour: Kshs .....  
Materials: Kshs .....  
Total Kshs .....
21. How will these costs be met? If the costs are to be met by the relevant  
Ministry, a commitment in writing to this effect by the Ministry HQ  
must accompany the application.  
.....  
.....  
.....
22. How long will it take for the project to be completed? .....
23. Are the local officers of the relevant Ministry able and willing to  
implement the project if it is approved? Yes/No
- Date .....  
(Signature of implementing officer)
- \_\_\_\_\_  
(Officer's designation and name of Ministry he represents)
24. Remarks by the District Development Officer:  
.....  
.....  
.....
- Date .....  
(Signature of District Development Officer)



25. Remarks by the Engineer Adviser on the viability and accuracy of the estimates of the project:

.....  
.....  
.....

Date .....  
(Signature of Engineer Adviser)

25. Remarks by the Provincial Planning Officer

.....  
.....  
.....

Date .....  
(Signature of Provincial Planning Officer)

---

(For use in the Ministry's HQ.)

27. Remarks by the RDF Adviser

.....  
.....  
.....

Date .....  
(Signature of RDF Adviser)

28. The project is accepted for a grant of Ksh .....

29. The project is rejected for reasons stated below:

.....  
.....  
.....

Date .....  
for: PERMANENT SECRETARY

c.c. The Permanent Secretary,

.....  
.....  
.....  
NAIROBI (Att: .....) )

\* The Provincial .....  
Ministry of .....  
P.O. Box .....

RECORDS TO BE KEPT ON THE CARD INDEX

\*Implementing Ministry

Funding of RDF Projects 1980/81 to 1983/84

Province - District	1980/81	1981/82	1982/83	1983/84	Total 1980-1984 %
<u>CENTRAL</u>					
Nyandarua	102,110	9,050	19,960	43,721	174,241
Muranga	2,090	53,673	50,218	-	
Kiambu	17,280	38,650	109,338	51,235	
Nyeri	84,254	18,598	29,665	43,250	
Kirinyaga	20,060	39,700	41,245	49,408	
	225,794	159,671	250,426	187,614	
<u>COAST</u>					
Lamu	-	45,500	38,925	29,268	
Kilifi	-	57,320	41,054	58,761	
Mombasa	-	25,026	7,646	24,827	
Kwale	-	35,414	36,817	36,932	
Taita-Taveta	-	44,500	58,340	29,637	
Tana River	15,000	42,000	148,129	47,119	
	15,000	249,760	330,911	226,544	
<u>EASTERN</u>					
Meru	-	41,250	-	71,496	
Embu	27,087	30,000	14,680	57,485	
Machakos	44,253	44,328	80,533	55,690	
Kitui	-	70,000	366,883	89,621	
Isiolo	4,692	36,008	37,926	10,500	
Marsabit	22,350	36,832	33,210	50,904	
	98,382	258,418	533,232	335,696	
<u>NORTHEASTERN</u>					
Wajir	-	18,679	18,750	50,904	
Mandera	-	36,347	13,810	36,893	
Garissa	31,234	36,348	13,350	63,066	
	31,234	91,374	45,910	150,863	



ASAL DEVELOPMENT FUND

Terms of Reference

- Object: To prepare a paper for presentation to the workshop on ASAL development entitled. 'ASAL Development Fund Possible Approaches and their Implications for Government and Donors.'
- Qualifications: A degree in economics or management with 5 years experience of the design and operation of development funds. The incumbent would be familiar with Kenya Government financial procedures and with social, agricultural and livestock conditions which apply in the ASAL areas of Kenya.
- Terms of Reference: On the basis of available documentation and discussion with Government, donors, banks and beneficiary groups the consultant will examine the several possible options for formation and use of an ASAL fund. Particular attention would be paid to: the size of a possible fund; the extent to which donors and Government should contribute; phased build-up of a fund; the relationship between a fund and credit facilities; the working of a fund at district level; the relationship between a fund and sectoral initiatives by line agencies.

KENYA  
ARID AND SEMI-ARID LANDS DEVELOPMENT

MARKETING IN ASAL AREAS

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APPENDICES

1. The Method used to estimate the value of milk and meat produced in the pastoral herd
2. Terms of Reference

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ACRONYMS

KCC	=	Kenya Cooperative Creameries
KMC	=	Kenya Meat Commission
LMP	=	Livestock Marketing Division (MLD)
NCPB	=	National Cereals and Produce Board

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

MARKETING IN ASAL AREAS

A. Introduction

Context

1. The Annex intends to provide supporting information for the general approach proposed in the main text and at the same time through an analysis of the marketing system, the production and consumption balance and the prevailing policy framework, identify potentials and constraints in the marketing sector and propose marketing options and strategies for the ASAL areas. The problem in undertaking this task is clear to anyone who has been involved in preparing projects or programmes in the ASAL areas: the dearth of comprehensive data. Nevertheless, the Annex reviews the present situation and trends using existing data and reports and in doing so also identifies the gaps in information - some of which could be filled in subsequent missions and some which are unlikely to be worth filling, even if possible. While no comprehensive study has been made of marketing in the ASAL areas, reports by the World Bank on the agricultural sector in general and on agricultural marketing in Kenya and by the Ministry of Agriculture and Livestock Development (MALD) on Livestock Marketing provide useful but general marketing information. Numerous other documents provide pieces of information or insights.

Orientation

2. In the majority of cases marketing in ASAL areas is done not as the primary outcome or end product of agricultural/livestock activities but as a secondary or subsidiary action: (i) to meet particular needs such as school fees and to buy consumables including certain food stuffs and/or clothes, tools, etc. or (ii) in response to severe drought or similar events that force the sale of livestock to survive. This is not to say that there are not major cattle owners who manage herds purely for marketing purposes or farmers close to centres of population that produce vegetables, fruits, etc. for sale on the local urban market. But, it can be assumed that the majority of people living in the ASAL areas are essentially involved in a subsistence dominated economy, whether they be nomads or marginal crop farmers, and that marketing of their products while occurring relatively regularly is not a principle orientation. Nevertheless, this picture is gradually changing, at least on the fringes. Increasing population pressure and reduced grazing areas are forcing a part of the nomadic pastoral population into more regular contact with the market economy and more grain is required in the diet to survive; this normally means partial sedentization and the taking up of crop production in parallel with ongoing herding activities. The direct implications are not totally clear but one important conclusion is that the marketing system as a support mechanism to an ASAL society will continue to be essentially a low volume, low investment and widespread one that must be flexible and able to respond to the limited demands and small offering of products for sale from a thinly spread population. The only marketing system that has been able to successfully meet these requirements has been the



network of small dukas/traders. Larger more centralized facilities such as cattle auction yards and holding grounds can only provide a limited coverage and are essentially for traders, they do not serve the majority of the target groups (Annex 2) in the ASAL areas.

## B. Population, Consumption and Demand Estimates

### Population Trends and Distribution

3. Annex 2, the Target Group, presents a detailed analysis of demographic trends in ASAL areas in its second chapter. The population of the ASAL areas, defined as including Zones IV, V, VI and VII (see Annex 9, for discussion) is estimated to be about 4 million people, or 20% of the national figure. In addition, there are estimated to be about 1 million pastoralists (World Bank, Collier and Lal 1982). As the agroecological zones do not coincide with the administrative or district boundaries, the figure must be considered as very approximate. The annual population growth rates in the ASAL districts, as projected for 1980-90 (see Annex 2, table 3), vary from as low as 2.5% (Mandera and Samburu) to a high of 5.6% and 5.7% (Laikipia and Garissa); the average is slightly above the national average of 4.0%.

4. In broad terms, a large part of the population of the ASAL areas is found in agroecological zone IV - in other words, in those districts or parts of those districts adjacent to the higher potential areas where mixed farming/livestock rearing is practiced. The key districts are Embu, Meru, Kitui, Machakos, Kilifi, Kwale, Narok, Elgeyo/Marakwet, Baringo, Laikipia and W. Pokot. Thus half the districts defined as falling within the ASAL zones (IV, V, VI and VII) have a substantial part of their area in zone IV. Geographically, they form a semi-circle around the central area - apart for the districts along the coast. The more thinly populated ASAL districts - Turkana, Marsabit, Mandera, Wajir, Garissa, Isiolo and Tana River - tend to be to the North and East of the country, are very poorly served by roads and generally isolated from the mainstream of the Kenyan economy. Apart from the district capitals, there are relatively few towns of any size; the urban population (2,000 people and over) is estimated to be less than 5%.

5. Population densities highlight and support the above discussion as the table below, taken from Annex 2, Target Group, illustrates. The radical differences in densities for those districts in agro-ecological zones V-VII (as compared to IV/V), practically all of which have densities of less than 10 persons per square kilometre and most of which are closer to 1-4 persons per square kilometre, shows structurally how difficult it would be to markedly improve marketing support to the outlying districts.

## Area Population and Density by Province and District 1969 and 1979

Province/ District	Area sq. km	Pop'n 1969		Pop'n 1969		Density		
		%	No.	%	No.	%	1969	1979
Embu	2,714	0.5	179	1.6	263	1.7	62	96
Isiolo	25,665	4.5	30	0.3	44	0.3	1	1
Kitui	29,388	5.2	343	3.1	464	3.0	11	15
Machakos	14,178	2.5	707	6.5	1,023	6.7	50	72
Marsabit	73,952	13.1	51	0.5	96	0.6	1	1
Meru	9,922	1.8	587	5.5	830	5.4	63	83
Eastern Prov.	155,759	27.8	1,907	17.4	2,720	17.7	12	17
Garissa	43,931	7.8	65	0.6	129	0.8	2	3
Mandera	26,470	4.7	95	0.9	106	0.7	1	3
Wajir	56,501	10.0	86	0.8	139	0.9	4	2
N.E. Prov.	126,902	22.5	246	2.2	374	2.4	2	2
Kilifi	12,414	2.2	307	2.8	431	2.8	24	34
Kwale	8,257	1.5	206	1.9	288	1.9	25	34
Lamu	6,506	1.2	22	0.2	42	0.3	4	6
Taita/Taveta	16,959	3.0	111	1.0	148	1.0	6	8
Tana River	38,694	6.9	51	0.5	92	0.6	1	2
Coast Prov.	83,040	14.7	944	8.6	1,343	8.8	11	16
Baringo	9,885	1.8	162	1.5	204	1.3	15	20
Elgeyo/ Marakwet	2,279	0.4	159	1.5	149	1.0	57	65
Kajiado	19,605	3.5	86	0.8	149	1.0	4	7
Laikipia	9,718	1.7	67	0.6	135	0.9	7	13
Narok	16,115	2.9	125	1.1	210	1.4	7	13
Samburu	17,521	3.1	69	0.6	77	0.5	3	4
Turkana	61,768	10.9	165	1.5	143	0.9	2	2
W. Pokot	9,090	1.6	82	0.8	159	1.0	16	17
Rift Valley Prov.*	163,883	29.0	2,210	20.2	3,240	21.1	12	19
Total Kenya	564,162	100.0	10,943	100.0	15,327	100.0	19	27

\* districts outside ASAL have been omitted from the district list but included within the provincial total.

## Household Consumption Levels/Demand Estimates

6. No comprehensive figures exist on consumption levels in ASAL areas. In fact, little information exists on consumption levels even on a national level except in terms of levels of malnutrition. However, a 1980 document by the Institute of Development Studies, Nairobi, entitled "Food and Nutrition Planning in Kenya" does make an estimate of per capita consumption levels for 1989 using 1979 as a base for nine major food items:

	<u>kg/per annum</u>
Maize	120
Rice	6
Wheat flour	10
Sugar	25
Beans	10
Potatoes	23
Sorghum/millet	20
Beef	14
Milk	60

These figures represent a national average. Clearly, ASAL consumption patterns are considerably different from these and even different groups within ASAL areas will have different consumption patterns: eg. the Masai versus the Nkamba. If it were possible to assume an "average" diet for people in ASAL areas and then convert it into calorie equivalents, then factor it down to the poverty line calorie requirement of 2,250 calories per adult per day (Collier and Lal), one could establish the base demand for meat, milk and cereals. But as the resulting figures would be extremely arbitrary and probably largely meaningless due to the diversity of peoples involved, this exercise has not been attempted.

7. Instead, the problem has been approached from the opposite direction. The amount of food that has been imported into the ASAL areas in the past gives a rough indication of the shortfall between self-sufficiency and food deficit. The publication "Regional and Seasonal Food Problems in Kenya" by the Food and Nutrition Planning Unit of the then Ministry of Finance and Planning (1985) estimates maize purchases and sales by National Cereals and Produce Board Depots (1974/75-1981/82). The deficit areas, as could be expected, are predominantly in the ASAL districts and a deficit of 1.8 million bags (or 162,000 mt) was experienced over the period. The report also records that these same areas were in deficit on average six years out of the eight. It could thus be estimated that the average annual deficit (excluding the two surplus years) would be about 30,000 mt. When this is converted into calorie equivalents it represents  $1.1 \times 10^{12}$  calories or 74% of the poverty line calorie requirement of the 5 million people in the ASAL areas. Although there are clearly large numbers of people in ASAL well above the poverty line calorie requirement, the shortfall is non the less substantial. The same report documents food relief by province between 1973 and 1983 in terms of maize and beans; Eastern and Northeastern Provinces have received 85% of the total maize (44 million mt) and beans (4.5 million mt) delivered nationally over the 10 year period. When compared to total movement of maize into the region (normal NCPB deliveries plus relief), this is equivalent to about 15%.

The Level of Maize Purchases and Sales by NCPB Depot (1974/75 - 1981/82)

Depot	District	Surplus (+) or Deficit (-) (in million bags)**	No. of deficit years in period 1974/75 - 1981/82
Butere	Kakamega	+ 359,040	3
Myanga	Bungoma	+ 312,484	2
Malaba	Busia	+ 107,043	1
Bungoma	Bungoma	+ 1,379,498	1
Webuye	Bungoma	+ 1,871,763	1
Kipkarren	Uasin Gishu	+ 419,306	-
Turbo	"	+ 1,146,837	-
Mois Bridge	"	+ 1,820,194	-
Eldoret	"	+ 2,189,605	2
Lugari	Kakamega	+ 678,532	-
Kitale	Trans Nzoia	+ 3,532,994	1
Nakuru	Nakuru	+ 1,257,775	2
Nyahururu	Laikipia (x)	+ 508,245	3
Kericho	Kericho	+ 413,662	4
Kipkelion	Kericho	+ 528,838	1
Kilgoris	Narok (x)	+ 93,172	1
Kisii	Kisii	+ 482,899	3
Kendu Bay	S. Nyanza	+ 690,513	1
Homa Bay	"	+ 469,663	2
Muhoro Bay*	"	+ 177,109	-
Yala	Siaya	+ 43,227	4
Kisumu	Kisumu	- 259,446	3
Machakos	Machakos (x)	- 270,480	6
Kibwezi	"	- 280,140	6
Konza	Kajiado (x)	- 488,161	7
Kitui	Kitui (x)	- 207,100	5
Nanyuki	Laikipia (x)	- 260,996	8
Meru	Meru (x)	- 109,026	4
Thika	Kiambu	- 265,584	7
Sagana	Murang'a	- 444,257	6
Voi	Taita/Taveta (x)	- 160,883	7

\* Ceased to be a depot in the 1977/78 agricultural season.

\*\* Deficit = quantity of maize bought from farmers is smaller than the quantity sold to rural consumers. One bag equals 90 kg.

(x) ASAL districts

Source: Calculated from NCPB depot records: 1975-1983

8. The above figures indicate that there are major periodic food deficits in the ASAL areas which would appear to be as frequent as six years in eight - rainfall data tends to substantiate this pattern. As such, the demand for food, primarily maize in times of deficit, is such that a substantial portion of the ASAL population could be assumed to be well below the minimum calorie level based on their own food production capabilities - either through farming or livestock rearing or a combination of both - in all but the best rainfall years. The following paragraphs indicate the level of current demand for meat and milk.

9. The largest demand for meat is outside the ASAL areas. Even though the nomadic populations have meat as a major part of their diet - along with milk - their numbers (1 million) were negligible when compared to the national requirement of over 20 million people. Official estimates from the Ministry of Finance place demand for beef in 1985 at 130,000 mt, about in line with current levels of production. The Ministry projects demand to increase to 328,000 mt by the year 2000 - or about 6.5% annually.

10. The Ministry of Agriculture and Livestock Development in its 1985/86 Livestock Marketing Study estimates the demand for milk for the years 1990 and 2000 using the following five assumptions:

- population growth - 4%;
- urban population growth (Nairobi, Mombasa, Nakuru and Kisumu) - 8%;
- GNP growth - 4% and incomes stable;
- real price of milk to remain unchanged; and
- price of milk relative to its substitutes to remain unchanged.

11. Using these assumptions and taking a 1983 base consumption of 1,613 million litres (equivalent to a per capita consumption of 90 litres/year), total 1990 consumption was projected to be 2,125 million litres and Year 2,000 consumption, 3,144 million litres. Although this figure would appear to be high, it is still maintained as the current basis for government projections.

### C. Production: Cereals

#### ASAL Crops and Yield Levels

12. Annex 9, Agriculture, provides a detailed review of crops grown in the ASAL areas and their yields. In summary, they are as follows:

	<u>kg/ha</u>
Sorghum	800-1200
Millet	800-1500
Maize	400-700
Cowpea	300-500
Green gram	200-300
Pigeon pea	200-400
Cassava	-

13. These yields might appear low, but, they reflect the fact that partial and even total crop failures are included within the averages. This is particularly reflected in the maize yields. In a year of good rainfall well over a tonne can be expected. Although sorghum and millet have higher yields than maize and are far less susceptible to drought, evidence shows that there is a definite movement into maize. This can be explained partially by the greater ease of preparation as a food and increasing taste preference for maize meal but also by the fact that maize is a more easily tradeable item, even if only on a barter level within the community.

Cropped Areas

14. The measuring of cropped areas in ASAL has been very unreliable, however, figures are quoted by district for ASAL crops (Source: MOA District Annual Reports); these are reproduced in table 6, Annex 9. The totals for the 22 ASAL districts for 1980 and 1985 are as follows:

	<u>1980</u>	<u>1985</u>
	: .....ha.....	
Sorghum	51,907	86,675
Millet	5,308	3,144
Maize	n/a	n/a
Cowpea	71,405	67,900
Green Gram	11,485	37,373
Pigeon Pea	67,116	29,140
Cassava	38,524	31,011

While it cannot be stated with certainty that these hectares fall exclusively within ASAL zones IV-VII, as these crops are grown predominantly in ASAL zones and very little in zones I-III, they should be a relatively close approximation. No hectares for maize are presented as it is impossible to distinguish, from district statistics, the portion of maize that is in the ASAL areas (zones IV-VII) and that part which lies in the higher potential zones. Only by going down to the divisional level statistics could an approximation be made.

ASAL Production

15. Average ASAL production, as can be roughly derived from the figures in the above paragraphs, while giving an approximate idea of average self-sufficiency do not contribute greatly to the understanding of the marketing requirements. In years of good rainfall some of the ASAL areas will produce a surplus, others will reduce the size of their shortfall. In years of poor rainfall or drought most ASAL areas will be in deficit as the maize movement figures indicate (para. 5). From the available data the following production figures can be presented:

	Average Production	Good Rain years	Bad years
	-----mt(000)-----		
sorghum	86.7	104.0	69.3
millet	3.6	4.7	2.5
maize	n/a	n/a	n/a
cowpea	27.2	34.0	20.4
green gram	9.3	11.2	7.5
pigeon pea	8.7	11.7	5.8
cassava	n/a	n/a	n/a

16. The trends in production in ASAL areas are very difficult to forecast due to the extreme cyclical nature of the rainfall. However, the gradual introduction of improved draught resistant varieties of maize, such as katumani, should raise the average yield levels. A gradual expansion of the area under crop and reduction of shifting cultivation, both of which

appear to be gradually taking place, will slowly increase the overall production in the area.

17. Production of other crops such as vegetables have very little impact on the majority of people in the ASAL areas as they are grown on a very limited scale and normally adjacent to urban areas.

D. Production and Supply: Livestock Products

Herd Sizes

18. The national beef herd is divided into five by type of management system, only one of which is directly relevant to the ASAL areas - the pastoral herd. As the table following shows, out of a total herd (1983) of around 11 million head about one-third of the animals come within the pastoral herd.

National Cattle Herd by Province and Type of Herd, 1983  
( '000 head)

Province	Grade Beef	Pastoral	Smallholder Zebu	Smallholder Grade Dairy	Large-Scale Dairy	Total
Eastern	1	668	813	142	12	1,636
Coast	11	357	353	22	3	746
Central	49	-	280	630	22	981
N.Eastern	-	837	-	-	-	837
Rift Valley	324	1,812	1,054	999	217	4,406
Western	-	-	694	56	-	750
Nyanza	-	-	1,528	56	8	1,592
Total	385	3,674	4,722	1,905	262	10,948

Source: Livestock Development Division, MALD, Annual Report, 1983.

Not included within the pastoral herd are those animals trekked into Kenya from adjacent countries, primarily Somalia, Ethiopia and Tanzania. Although difficult to estimate, it is assumed that somewhere between 100,000 and 150,000 head enter Kenya each year. The table below documents this estimate. Thus the total beef herd is slightly over 11 million head.

Estimated Numbers of Cattle Entering Kenya from Tanzania, 1983  
( '000 head)

District	Cattle Population	Offtake (8%)	Offtake Entering Kenya	
			30% of Offtake	50% of Offtake
Mara	1,000	80	24	40
Arusha	2,000	160	48	80
Kilimanjaro	400	32	10	16
Tanga	500	40	12	20
Total	3,900	312	94	156

Source: Proceedings of the 7th Scientific Conference, 1980.  
Tanzanian Society of Animal Production.

19. The dairy herd, the numbers of which overlap with those of the beef herd, is composed of four sub-herds, the sizes of which are estimated below (1983):

	<u>No. of Cows</u>
Pastoral	1,650
Smallholder zebu	2,100
Smallholder grade dairy	855
Large-scale farm dairy	155
	-----
	4,760

Beef Production

20. In the MALD's Livestock Marketing Study of 1985/86 (para. 1), it is estimated that the total production from the five major herds in 1983 is as follows:

	<u>mt*</u> (000)
Beef herd on large-scale farms (25%)	19.2
Pastoral herd (8%)	37.9
Smallholder zebu herd (8%)	48.7
Grade dairy herd (13%)	15.6
Imports of live cattle (8%)	6.5-13.0
	-----
Total	128.9-134.4

\* total carcass weight.

The figures in brackets are the assumed per annum average offtake rates. The average carcass weights were assumed to vary from 100 kg c.d.w. for pastoral, smallholder and grade dairy herds to 200 kg c.d.w. for the large-scale farm beef herd. The potential for expansion of meat production is directly linked to that of milk production. The present price ratios discourage beef in favour of milk (Attachment 1). This is discussed further in the following section.



Milk Production

21. About half of the milk production comes from the smallholder grade dairy herd (48%) followed by the large-scale farm dairy herd (29%) and then the smallholder zebu herd (13%) and finally the pastoral herd (10%). The levels of production (1983) and the working assumptions used by MALD in the calculation are the following:

	litres (millions)
Smallholder grade dairy herd (900 l.)	770
Large-scale farm dairy herd (3000 l.)	465
Smallholder zebu herd (100 l.)	211
Pastoral herd (100 l.)	167
	-----
Total	1,613

The figures in brackets are the assumed milk yields per annum per cow after calf's milk has been deducted - i.e. that which is available for human consumption. In the MALD study, it was assumed that all the milk from the pastoral herd would be used for family consumption; thus none would reach the market.

E. Estimates of Market Potential

Cereals

22. The preceding sections have illustrated that the demand for cereals in the ASAL areas exceeds the supply in all but the best rainfall years. In those years, surpluses do occur in some of the areas, part of which is stored on the holding as a security reserve and part which is marketed. Most of what is marketed passes through informal channels - either the local market or trader or is bartered to pastoralists. Very little is sold through official channels. There are a number of reasons. First, the years when ASAL areas receive good rains are also the years when the higher potential areas also receive good rains, thus maize surpluses are widespread and the NCPB buying centres are reluctant to purchase additional volumes from areas where they normally have a net outflow. This situation occurred in 1986 when there was a bumper maize harvest and insufficient storage. Second, the majority of ASAL areas are very poorly served by NCPB depots except for a few areas directly adjacent to higher potential areas. Thus, only a very limited proportion of the ASAL farmers have physical access to this market. Third, apart from maize, the only other two officially scheduled crops are sorghum and millet, both of which the NCPB buys only negligible quantities. The reason is that it has almost no means of disposing of the sorghum and millet it buys. In general, the likelihood of the area producing surpluses most years is almost negligible. The rapid population increase, limited and low fertility of much of the land and scarce rainfall will continue to dictate against large surpluses. Certain producers in certain areas will certainly produce surpluses and many producers will sell a certain portion of their crop, however small, to pay for things such as school fees and basic necessities (tea, sugar, clothes, etc.). In most cases, the marketing of this produce will be very local, often within the community. The main food oriented development goal must be to try to increase production to reduce the cereal deficit that is experienced annually in the ASAL areas and not to explicitly work towards producing surpluses for marketing - i.e. a

food security strategy. Government's intervention is required basically on the production side not the marketing side. Even where surpluses are occasionally produced, the quantities are so small and scattered that only the informal/private sector is sufficiently flexible to respond to it. There might, however, be a role for technical support to farmers in construction of better on-farm storage.

23. One area where data is missing is in terms of flows of cereals to and from the informal market. A case study would be useful, not to generate detailed statistics, but rather to document the operation and the "why's" and "wherefore's" of operation of the market. A compiling of existing cereal data by divisions that fall within the ASAL zones (IV-VII) from MALD Annual District Reports would complement this and help to develop a better picture of the production side, especially for maize.

#### Livestock Products

24. Unlike cereals which are produced in ASAL areas primarily for home consumption/food self-sufficiency of the family with marketing only playing a very secondary role when occasional surpluses are produced, livestock are raised primarily to be sold. Admittedly livestock and livestock products form the base and in many cases the majority of the diet of nomadic people, but the modus operandi of a pastoral society has a strong element of trading and marketing animals. Even the common practise of holding animals for security and status is closely linked to the ability to have the animals available to sell when necessary.

25. Furthermore, the market animals from ASAL is almost exclusively outside the ASAL areas in the high population central part of Kenya. There has been considerable discussion as to what extent Kenyan demand for livestock products is currently in excess of supply. Although no detailed studies nor statistics exist, the regular movement of cattle into Kenya from surrounding countries combined with the very limited export of livestock products (see table below), which represent only 5% of the gross value national production, would appear to indicate that there is currently a shortfall of in supply of beef.

Estimated Value of Exports of Beef and Beef Products - 1978-1983

	1978	1979	1980	1981	1982	1984
Beef (bone - in)	-	-	2.2	5.7	6.0	3.4
Beef (boneless)	18.5	9.4	3.2	7.2	8.5	8.2
Beef extracts	neg.	0.2	1.8	2.1	0.3	0.3
Canned beef.	22.5	28.9	17.0	28.6	66.6	61.6
Total Ksh millions	41.0	38.5	24.2	43.6	81.4	73.5
US\$ millions	2.6	2.4	1.5	2.7	5.1	4.6

Source: Annual Trade Reports: Dept. of Customs and Excise.

26. The demand for milk is also in excess of national supply. In 1983, Kenya imported dairy products with a gross value of Kenyan pounds 6.1 million (US\$7.2 million); the net foreign exchange balance was a Kenyan pounds 4.3 million (US\$5.4 million) deficit, as the table below shows.

Net Foreign Earnings (1983)

	Value Imported	Value Exported	Net Earnings
Dairy products	3,076	1,622	-1,454
Milk and cream	2,654	53	-2,601
Butter	408	149	-259
Cheese	5	23	+18
Total Kenyan pounds '000	6,143	1,847	-4,296
US\$ millions	7.7	2.3	5.4

Source: Annual Trade Report, 1983

Net value imported represents about 3% of the total value of milk produced in country (at the farmgate in 1983).

27. Beef. The potential for expansion of the livestock sector would appear from the MALD projections (para.8) to be substantial. With a projected demand of 328,000 mt by the year 2000, 152% above current levels, there would have to be a considerable expansion of the national herd, higher off-take rates and an adjustment in pricing to bring meat prices in line with those of milk, (para. 41). Even assuming these occur, it is concluded from the 1985/86 MALD livestock study that it is unlikely that this figure will be reached as the table below illustrates.

Potential Increases in Beef Production from the Kenyan Cattle Herd - 1985-2015

Herd	Present Production (tonnes p.a.)	Potential Production (tonnes p.a.)	Percentage Increase
Beef herd on large-scale farms	19,200	21,500	12%
Smallholder Zebu herd	48,700	73,000	50%
Pastoral herd	37,900	77,500	104%
Smallholder dairy herd	13,700	50,000	265%
Dairy herd on large-scale farms	1,900	14,000	636%
Imports	10,000	10,000	
Total	131,400	246,000	88%

Source: MALD, Livestock Marketing Study, 1985/86.

The above increases assume that prices would rise by 30% (in real terms), a prerequisite it is stated to improve the profitability of the beef enterprise and to stimulate the required investment to achieve the stated potential. For the pastoral herd, this implies a 2.6% annual increase. This increase is assumed to come with little or no direct government intervention because, as stated, there is little the Government can do directly beyond making drugs available to increase production.

28. Milk. The current level (1983) of milk production (1.6 million litres) would have to be doubled to over 3 million litres to meet the projected demand for the year 2000. However, the MALD study assumes that the increase in marketable production would have to come almost exclusively from the smallholder and large-scale farm dairy herds, as the milk produced by the pastoral herd would continue to be primarily used for household consumption. This would appear to be somewhat overstating the case as there is definitely potential for increased production for market on the "close-in" pastoral zones especially in Narok and Kajiado, as has already been demonstrated. However, in the overall picture the study's assumption is basically correct; there will never be a great volume of milk coming out of the pastoral areas. What is produced could be readily sold if the cattle are within range of buying centres.

29. Sheep and Goats. In spite of the work of the FAO Sheep and Goat project, there are very limited statistics on numbers of sheep and goats. The 1985 estimated of the sheep and goat population is about 15 million head, the largest part of which is found in the ASAL areas. If an annual off-take rate of 30% is assumed (estimated by the Sheep and Goat Project), over 4 million sheep or 50,000 mt of meat would be produced about 40% of the current beef production. A large part of the sheep and goat meat is sold or bartered in local markets within the ASAL areas but a portion are also trekked to higher potential areas. As might be expected by the nature of sheep and goat trade, no comprehensive figures exist. Nevertheless, with the projected shortfall in beef supply versus demand (para 26), a ready market for increased production of sheep and goat meat from ASAL areas could be assumed.

30. Hides and Skins. Although no detailed statistics were available to support it, MALD has proposed the improvement and expansion of hides and skins processing and marketing. To this effect, a new processing plant has been established in Embu.

#### F. Pricing and Marketing Systems

##### Cereals and Other Food Crops

31. The NCPB is officially responsible for the marketing of the key ASAL food crops. While it is the monopoly buyer of wheat and irrigated rice, for all other crops it acts as the buyer of last resort, not actively intervening in the market but officially accepting deliveries from farmers and traders. Trading in maize is by far the most important activity of NCPB. Nevertheless, NCPB while sometimes an important force in the market is essentially a minority buyer with the informal/private sector handling most of the marketing. The Board's depots in ASAL districts are limited (see Table in para.7), but it does operate season buying stations. Although storage facilities are in short supply nationally in peak production years, primarily for maize, NCPB's facilities are in general sufficient to meet the

demand. In general, as the table in para. 7 shows, NCPB is a net supplier of maize to ASAL areas.

32. The procedures for determining prices <sup>1/</sup> follows a standard pattern. In conformity with the Agricultural Act, the price is reviewed by the government annually prior to 15th December. It is announced in December or January, in advance of the main long-rains' planting season, which commences in late March. The price applies to the harvest from all maize planted during the calendar year in question. The price at the depot is normally gazetted prior to the general commencement of harvesting in July. The prices paid at buying centres and depots are uniform throughout Kenya. Farmers are paid cash at the buying centres at the time of delivery and by cheque at the Board's depots. At the depot, payment is made net of amounts owed to the Agricultural Finance Corporation for seasonal credit. Maize prices on informal rural markets fluctuate widely. Normally, the NCPB buying price sets a floor for the price on these markets. However, in a number of years, following good harvests, the Board has been forced to suspend buying or to delay paying farmers. In these years, prices in surplus areas have declined below the Board's purchase price. For other scheduled food products, producer prices are determined most commonly by the forces of supply and demand in rural and urban markets. NCPB buying prices for these products have normally been set by the Board twice yearly on the basis of export parity and implemented following approval by the Minister for Agriculture. In recent years, prices have been set annually with changes on occasion being made through ad hoc government directives.

33. The current official price of maize is reported by the World Bank to be slightly below the world market price but not sufficiently so to substantially effect production incentives. The official prices of sorghum and millet are also not unrealistic; but as NCPB buys practically no sorghum and millet, the official prices of these two crops have little impact on the prices received by the producers.

34. In general, in the ASAL areas, the informal market plays the dominant and in many areas exclusive marketing role. Only a very small percentage of cereal production is traded as discussed earlier. The main constraints in the system are associated with transport and storage (primarily on-farm storage) not with pricing or the marketing system per se. Opportunities for constructive government intervention are limited.

#### Livestock Products

35. Beef and Other Meats. The marketing of meat has increasingly become the dominant of the private sector. If present, it is estimated that over three-quarters is handled by the private sector. In general the animals are moved, often on the hoof, from pastoral and rural areas to the major consumption centres. In the pastoral areas there are a number of stock routes which a high proportion of the cattle owners use to bring their animals to the central areas of Kenya. Depending on the size of the herd and the owners commitments, the animals will either be trekked directly to central markets/abattoirs or sold in an outlying market or to traders who will in general either sell them in another market or to rural butchers or

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<sup>1/</sup> Considerable parts of the information on prices which follow are extracted from a draft World Bank document, Agricultural Pricing and Marketing in Kenya since 1970, January 1986.

take them to an abattoir. Legally, all cattle entering the high potential zone from pastoral areas are supposed to pass through a quarantine at a government holding ground but the holding grounds while still important have had problems due to lack of operating funds and the fact that many livestock owners attempt to bypass the holding grounds and avoid the associated delays in marketing (i.e. non-pastoral) their animals. The rural marketing is similar but with the numbers of animals sold being smaller they often pass through more hands prior to slaughter. Slaughtering takes place in abattoirs, most of which are privately owned, or is done by private butchers. All retail sales are made through privately owned outlets.

36. The Ministry of Agriculture and Livestock Development (MALD), now separated as the Ministry of Livestock Development (MLD) has overall responsibility for livestock marketing - the two most important arms of government intervention in the sector being the Kenya Meat Commission (KMC), a parastatal company, and the Livestock Marketing Division of MLD. Until the early 70s, KMC had monopoly powers over the wholesale supply of meat to Mombasa, Nairobi and Nakuru and owned abattoirs in each of these towns. During the 1970s, privately-owned abattoirs were licensed to supply beef to these towns and the KMC is now just one of a number of competing wholesalers. However, it has kept its monopoly over the export of beef and continues to act as a buyer of last resort. The Livestock Marketing Division (LMD) was very active until a few years ago. It was a major purchaser of cattle and ran auctions throughout the country. However, the auctions tended to be poorly announced, with inconsistent buying policies and in consequence, instead of assisting the livestock owners often increased their problems as the two quotations <sup>1/</sup> below illustrate:

"In July 1979 LMD bought all animals above the weight of 120 kg. In July 1980 it bought only male animals over 180 kg. Big bulls and old animals however healthy looking were rejected. --- These policy changes mean that a trader can never be sure that he will sell all his animals at LMD prices. He might be forced to sell some at Marsabit market and during LMD purchase times prices are at their lowest here. Any profits gained could all be lost by sale of some animals at such low prices. This actually happened in July 1980 when traders from Sololo trucked animals including female ones at Ksh 120 an animal only to be told at Marsabit that LMD were not buying females. One of these told me that he sold the females at prices which could not meet the initial cost and his transport cost. At this auction alone well over 800 animals were rejected."

"LMD take a very long time to pay for the animals they have already accepted. The payments of the animals sold in July 1980 were made after more than one month. For a trader who has sold all his animals and who has an empty shop at home this delay is extremely frustrating. For the pastoralist who came from 200 km away to sell one bull such a long stay away from his animals could be disastrous to his herd. The expenses he incurs while waiting for the money to come may be so large that he would rather sell to a trader who pays him half the price in cash."

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<sup>1/</sup> Njiru, G.K. The Rendille Economy - Some Preliminary Findings on Trading Activities, Institute of Development Studies, Working Paper No. 389, March 1982, Nairobi.

37. Although the Government has very wide legislative powers enabling it to intervene in the market for beef and to set and enforce prices at all levels, it does not exercise them in full. Effective intervention takes place at two points only. First, under the Kenya Meat Commission Act prices are set for KMC purchases of cattle bought c.d.w.. Although the KMC purchases only 5-10% of all cattle slaughtered, its prices provide a guideline for cattle prices throughout the country. Second, maximum retail prices for beef sold in a largely undifferentiated form, such as beef-with-bone, beef-without-bone and offals, are gazetted under the Price Control Act for every district and municipality in Kenya. Maximum wholesale prices of beef carcasses are also gazetted under the Price Control Act. There are two schedules, one for the KMC and another for all other abattoirs. The prices in the schedule for carcasses sold at KMC abattoirs are usually marginally higher than those for other abattoirs. Gazetted prices are enforced at the KMC but since only 6-10 percent of the total weight of KMC throughput is sold in the form of carcasses, its prices have little effect on the general level of carcass prices. No attempt is made to monitor or enforce prices at other abattoirs and carcass prices frequently rise above the gazetted maxima.

38. Although, livestock owners will often complain that the prices they receive for their animals are too low, and in many cases this might be true but experience to date, as illustrated by the quotations above, indicates that it is difficult and largely ineffective for Government to be directly involved. Probably the most useful services it could provide is one of market information; but even this is far from easy to achieve and serves little purpose unless up-to-date and responsive.

39. Milk. The marketing of milk and dairy products is controlled under the 1958 Dairy Industry Act (Cap 336) which established the Kenya Dairy Board whose main functions are to advise the Minister for Agriculture on the pricing and marketing of milk and dairy products and to implement regulations introduced under the act. Control over the marketing of milk is exercised mainly through the issuance of licences to transport, process and sell milk and dairy products. The Dairy Industry Act specifically excludes milk produced by farmers for home consumption and milk produced outside what are termed 'Scheduled Areas', thus excluding all the ASAL areas.

40. Milk production is essentially a smallholder enterprise. Of the estimated 1,600 million litres produced for human consumption annually, 70% is produced by farmers with fewer than 10 cows or by pastoralists. It is estimated that only 600 million litres enter the market, the remainder being consumed by the producers and their families. The collection and distribution of milk for sale in the larger towns and urban areas is dominated by the Kenya Cooperative Creameries (KCC), which is registered under both the Companies Act and the Cooperative Societies Ordinance. However, of the 600 million litres of milk which enter the market, only 240 million litres are handled by the KCC. The KCC receives milk at thirteen plants, of which all but two are located in the milk producing areas to the west of Nairobi. In rural areas, consumers typically buy direct from neighbouring or nearby farmers in ASAL areas, apart from nearby to towns, practically all the milk is kept for household consumption as milk forms the most important part of the pastoralists diet. In townships which are either not served by the KCC or which are outside the scheduled areas in which the KCC has an effective monopoly, milk is brought in by farmers or small traders for direct sale to consumers, cafes and hotels.

41. Throughout the 70s and 80s, the Government has set minimum producer prices and maximum wholesale and retail prices for milk. Producer prices are fixed under the Agricultural Act, but are not gazetted. Instead, they are formally set by a letter from the Minister for Agriculture and Livestock Development to all institutions which have a licence to purchase and process milk. Since 1982, producers have received a per-litre dry season bonus in the months of January to April, aimed at reducing seasonal variation in supply. During the 70s, wholesale and retail prices for milk were gazetted under the Dairy Industry Act and applied to milk in scheduled (higher potential) areas only. During this period prices sometimes differed between regions. In 1982, wholesale and retail milk prices were gazetted under the Price Control Act and were applied to all parts of Kenya. No regional differences have been allowed during the 80s. Prices set by the Government apply directly to the milk which is sold through the formal marketing system. The price received for milk sold locally in rural areas normally falls between the official producer price and the gazetted retail price, the precise level being determined by local conditions of supply and demand.

42. Comparison Between Meat and Milk Prices. The current price ratios favour milk over beef. Attachment 1 to this Annex contains an analysis made by MALD in 1985/86 which shows for the pastoral herd (under grazing and livestock management levels common to the herd) that grazing utilized by one cow produces milk with a value of between Ksh 460 to Ksh 1100 per annum, whereas a cow under the same conditions but used for meat production will give a value of Ksh 400 to Ksh 572 per annum. With the natural tendency for the average pastoralist to bias his herd management towards milk which is not marketed, his marketing limited almost totally to sale of stock for beef, changes in price ratios would have little impact on his management strategy.

#### Other Products

43. There is a wide range of secondary activities undertaken in these areas but only a few have more than local significance. Some of the most important are (i) charcoal making, mainly for selling to centres where most of the adjacent land has been stripped of firewood, (ii) handicrafts, which while appearing to be an attractive activity, have only limited scope due to the already large production of handicrafts and the difficulty and knowledge required to enter the sophisticated tourist market and (iii) sisal products, which while sold on the tourist market also have function uses such as straps, rope and bags in the areas where sisal is grown.

### G. Current Government Policies

#### Fifth Development Plan (1984-88)

44. Within the Agriculture and Livestock section of the Plan, improvements in marketing are accorded one of the highest priorities. In the context of fair prices which provide incentives for smallholder production, better access to markets, elimination of local food shortages and improved national food security, the Plan notes thirteen programmes and areas of concern to be addressed. Among these, the most important for ASAL areas are the following:

- NCPB is to be strengthened as a buyer and seller of last resort; in parallel, grain storage including on-farm storage will be encouraged;



- priority in grain milling is to be accorded to small-scale mills run by producer and consumer cooperatives as well as by individual entrepreneurs;
- the market system for livestock is to be revised to encourage more private sector participation with prices responding to the free market, however, a guaranteed minimum price for cattle is to be maintained to protect producers in case of drought; and
- honey refining and domestic leather processing as private enterprises are to be encouraged.

Session Paper No.1 - 1986 1/

45. No specific attention is paid to pricing, incentives or agricultural marketing in general in the Session Paper. The only reference to marketing comes under the section, Role of Cooperatives, where it is stated that cooperatives will be encouraged to broaden their role in the marketing of outputs not only of agricultural products but also of handicrafts and simple manufactured goods. It is recognized, however, that management is the key constraint and greater attention and increased resources will have to be allocated to the training of managers.

H. Ongoing and Planned Support - Projects and Programmes

46. There are currently no projects or programmes that address exclusively marketing in the ASAL areas. However, the majority of the numerous ASAL area development projects, which are analysed in Annex 1, include one or two marketing actions within their overall scope of activities. As might be expected, most of the marketing support provided in these projects has been directed towards the livestock sector.

47. Interventions in livestock marketing mainly through establishment of sales yards and the conducting of auctions have had limited success primarily due to a number of factors including opposition by local traders. While operating, higher prices were generally achieved, but with inefficient management, erratic buying policies and pressure from the traders, most of these operations have been terminated - Baringo is one of the few exceptions where regular auctions are still held and higher prices are being maintained. The funnelling of stock towards Baringo from the north and the good tarmac road to the south combined with strong official support have certainly aided this operation. It was claimed in Kitui, where auctions were carried out for a short time by the ASAL project, that it was not only the traders opposition but the incidence of foot-and-mouth disease and the high cost of operating the auctions with a dispersed livestock population that made the operation infeasible. In Turkana, a destocking programme using maize in exchange for sheep and goats only managed to run one operation - the failure was attributed to pressure from local traders. In spite of these difficulties, projects still try to undertake interventions in the livestock market. The proposed project in Kajiando plans to construct holding grounds and hold auctions; the EMI project is considering rehabilitating the Isiolo

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1/ Annex 3 provides details.

holding ground and adjacent stock routes; and the Dutch in Elgeyo-Marakwet and W. Pokot are also supporting livestock marketing. The Wamba Project in Samburu has attempted to attack the problem from a different direction. It is providing funding on credit terms for under-financed traders to purchase sheep and goats and transport them to Nairobi for sale. This is very much a pilot operation and is too early yet to assess the results but it could have promise.

48. A major project to support the marketing of sheep and goats, mainly oriented to the ASAL areas, was prepared in 1983 by the FAO Investment Centre for financing by the African Development Bank. The project was appraised in 1984 but by mid-1986 the project had still not been signed and there appears currently to be differing opinions as to the project's future. Although the project was to concentrate on sheep and goat marketing, due to the inability to disaggregate marketing activities, cattle and camels were also to be catered for. While the general objective of the project is to increase sheep and goat production and offtake, it sees improvements in the marketing system as the means of achieving this goal. Marketing support includes the construction of auction yards (52) and rehabilitation and construction of holding grounds (18) plus institutional support for the Livestock Marketing Division (LMD). The investment in marketing, 90% of which was destined for ASAL areas, represents about two-thirds of project costs and totals about US\$10 million. The final outcome of the project should be known in 1987.

49. Support for crop marketing has been extremely limited. The Machakos Integrated Development Project supported cotton marketing through the construction of a few cooperative stores; in Elgeyo-Marakwet, support will also be given for construction of cooperative stores. Apart from these two initiatives, the only support for crop marketing was in Wamba where the project has helped form multipurpose marketing groups, particularly in areas where traders do not currently operate. In parallel, support in the form of inventory investment has been provided to small traders and to certain of the new marketing groups. These dukas and group stores are seen as the nucleus of a new mini-service centre for these currently unserved areas. This programme is in the very early stages; five centres are planned in the next few years.

50. The only other marketing support has been for honey processing and marketing with new hives and collection centres financed in Kitui and Wamba and honey refining in Elgeyo-Marakwet.

#### I. Constraints to Marketing in ASAL Areas

51. Coming out of the previous sections, the following is a list of the major constraints and comments on marketing in the ASAL areas:

##### General Constraints:

- inherent constraints which in general cannot be greatly altered but which any marketing initiatives and most development actions must take account of are: (i) the thinly spread population and the associated large distances and limited road network, (ii) the subsistence nature of the agricultural activities and a large part of the livestock/pastoral activities, thus the low volumes to be marketed, (iii) the general absence of information on markets and prices for anywhere beyond the immediate vicinity of the manyatta,

and (iv) due to these and other factors, the lack of comparative advantage for many ASAL products in the national market with the possible exception of livestock;

- a critical conditioning constraint is the difficulty for Government to provide viable marketing support services in ASAL areas due to Government's inherent inflexibility and inability to respond and adjust quickly to changing circumstances and needs - very clearly demonstrated by the dismal failure of the Livestock Marketing Division (LMD) of the Ministry of Agriculture and Livestock Development (MALD) to intervene in the livestock markets and the similar problems experienced by the Kenya Meat Commission (KMC) - in both cases the private sector has prevailed;

Specific Constraints:

- maize has a ready market but sorghum and millet, the most adapted crops to the ASAL areas, have little market outside traditional barter and some sales in markets in and around the areas where it is grown; the recent attempt by FAO <sup>1/</sup> to demonstrate the marketability/acceptability of sorghum as flour and animal feed although largely a failure indicated that there was some chance of success but a viable demonstration was still needed and traditional resistance would have to be broken down - probably a long-term undertaking; the common practice for pastoralists to purchase posho (maize meal) in the dry season to supplement their diet is the most important item purchased by the pastoralists - does not bode well for the marketing of surpluses of sorghum or millet to the pastoralists in the traditional areas - most dukas do not accept it, and will probably not do so in the near future;
- the lack of capital inhibits many small traders, the aforementioned study on the Rendille found that most small traders (70%) were undercapitalized and operated on about Ksh 20,000 (US\$1,250) annually; this limits their ability to purchase animals (or crops), likewise to acquire the necessary retail goods with which to trade for the animals/ crops, and similarly to make trips (hire transport) to larger markets to sell animals and restock with consumer goods;
- the amount of stock offered for sale in small traditional markets is often insufficient to attract any but the local trader(s), sometimes resulting in insufficient competition and suppressing prices; the problems for a pastoralist to trek animals further to a larger market have been noted above;

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<sup>1/</sup> FAO/TCP, Sorghum Processing and Marketing in Kenya, Terminal Statement, March 1984.

- although there is little comprehensive information, the hides and skins trade appears, in spite of its importance to the pastoralists as a source of income, to be undeveloped: reportedly the traditional methods of drying skins on the ground instead of frame drying them reduces their quality and value; the opening of the new tanning plant in Embu could provide the opportunity to improve the hides and skins trade; and
- although it is often stated that the official prices of milk, beef, sorghum and millet are out-of-balance or do not provide sufficient incentive or alternatively depress the market, the overriding fact, particularly in the ASAL areas, is that most of the trade in these commodities does not go through the official channels at official prices but is handled by the private sector; for example: the Kenya Cooperative Creameries, the Government's official agency for buying milk, handles only 12% of the milk produced nationally (practically none from the pastoral areas), the rest is privately traded or consumed by producers and their families and friends; the KMC only buys about 25% of the cattle marketed, private traders and butchers buy the rest; and the NCPB rarely purchases sorghum and millet although they are officially gazetted crops; only the consumer prices legislated by the state (maize, beef (lower grades) and milk), to the extent that they are effective, and the lack in some areas of private sector competition, can be said to sometimes suppress the prices received by the producer.

#### J. Recommendations

52. The overwhelming conclusion from the above discussion of constraints is that the marketing of products from the ASAL districts is largely, and totally in many areas, in the hands of the private sector and while certainly not perfect, the system is operating. Large-scale and especially direct intervention by Government has been shown over and over again, especially in LMD's interventions, to be very costly to Government, an inefficient use of resources, disruptive to private trade that must carry the main burden of marketing especially in ASAL areas, and generally ineffective. With this scenario, the question must be raised: does Government have a role to play in marketing in the ASAL areas. The answer is yes, but in limited initiatives, locally keyed and basically in support of the private sector. Three possible actions could be considered to improve marketing in the ASAL areas:

- inventory support for small traders in the form of working capital loans in some cases linked to the purchase of certain items not normally stocked such as veterinary medicines for sheep and goats or improved seeds for pasture or crop establishment;
- credit for maize mills, sorghum dehullers and other village level processing to go to traders or farmers groups to help better utilize what surpluses are produced; and
- some form of market information (especially for livestock), only for the major marketing centres to be broadcast over radio.

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

THE METHOD TO ESTIMATE THE VALUE OF MILK AND MEAT PRODUCED IN THE PASTORAL  
HERD 1/

The Value of Milk Production

1. The average daily milk yield from lactating herds during 1981 was recorded by White and Meadows as being 1.6 litres, with a range of 0.6-3.0 litres. The average lactation was 250 days, which resulted in total milk yield per lactation of 400 litres - range 150-750 litres. Assuming that each cow has one lactation every two years, then the annual average production from a cow in the herd is 200 litres, ranging between 75 and 375 litres.

2. It is difficult to put a value on this production. However, at the ruling KCC price of Ksh 3.07 per litre (weighted average) the average annual value of production is Ksh 614.00 and ranges between Ksh 230.00 and Ksh 1,151.00. If all milk produced had to be purchased at KCC retail prices (Ksh 5.50 per litre) then the value of production rises to an average of Ksh 1,100.00 and has a range of between Ksh 412.00 and Ksh 2,063.00.

3. Thus the grazing utilized by one cow under this management system produces milk with a minimal average value of Ksh 614.00 per annum and could be as high as Ksh 2,063.00 depending on the values of coefficients used.

The Value of Meat Production

4. The average price of a four year old steer at livestock markets serving maasailand is approximately Ksh 1,600.00. The average price of similar animals at the KMC is Ksh 1,716.00 (130 kgs x Ksh 13.20 per kg c.d.w.). Thus the grazing utilized by a male animal produces beef with a nominal value of between Ksh 400.00 and Ksh 429.00.

Conclusion

5. Such calculations are fraught with difficulty and it is difficult to reach firm conclusions. However, on the basis of the above comparison it is reasonable to conclude that the rational pastoralist will seek to maximise with productio rather than beef production.

---

1/ MALD, Livestock Marketing Study, Appendix VIII 1985/86; Nairobi. 2.

MARKETING

Terms of Reference

- Object: To prepare a paper for presentation to the workshop on ASAL development entitled 'Suggestions for Government Support to Marketing in the ASAL Areas.'
- Qualifications: A degree in economics with at least seven years experience with the functioning of Government and/or parastatal support to marketing. Familiarity with the particular problems associated with marketing of grains and live-stock in remote areas is necessary.
- Terms of Reference: Annex 5 of the issues and options paper reaches the conclusion that Government initiative should be local and basically in support of the private sector. This conclusion should be tested with relevant government and parastatal organizations concerned with marketing in ASAL areas. The reactions should be documented and should lead, together with the annex conclusion to an examination of actions which could be taken by whom and how. The detailed options which result should be presented so as to provoke discussion at the ASAL development workshop.

*CONFIDENTIAL*

Report of the  
FAO/IFAD  
COOPERATIVE PROGRAMME  
INVESTMENT CENTRE

*No.*

*Date*



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
ROME

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27 February 1987

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ISSUES AND OPTIONS

(Volume 2 of 2 Volumes - Annexes 6-10)



KENYA

ARID AND SEMI-ARID LANDS DEVELOPMENT

CREDIT

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APPENDIX

1. Terms of Reference

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ACRONYMS

AFC	=	Agricultural Finance Corporation
CBK	=	Cooperative Bank of Kenya
KCB	=	Kenya Commercial Bank
KGCCU	=	Kenya Grain Growers Cooperative Union
RSCP	=	Rural Savings and Credit Project
USCP	=	Urban Savings and Credit Project

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

CREDIT

A. Background

Introduction

1. The information for this Annex was drawn from discussions held with officials and foreign experts in country and from a number of publications among which the World Bank's, Kenya - Agricultural Credit Policy Review of 1985 and Kenya - Agricultural Sector Report of 1986 were the most important. The Annex is primarily oriented towards the agricultural credit sector but does also cover briefly credit for off-farm investments. The Annex provides first a brief background and thereafter discusses some possibilities for the inclusion of credit into the operations of the ASAL Development Fund (Annex 4). In the next stage of preparation, the sector will have to be explored in greater depth by a credit specialist - summary terms of reference are supplied in Appendix 1 of this Annex.

Government Credit Policy

2. Agricultural credit has been an important sector for Government since Independence when large amounts of credit were made available to facilitate the financing of land transfer from Europeans to Kenyan farmers. Large sums of money have continued to be poured into the sector but with limited success, particularly in getting credit to smallholders. Recent government policy has been to (i) encourage greater private/commercial lending to agriculture and (ii) provide public sector credit for seasonal crop loans and term lending through the Agricultural Finance Corporation (AFC) and the Cooperative Bank of Kenya (CBK). This has been pursued through the introduction of financial measures including control of interest rates and subsidized support for AFC and CBK, and the financing of numerous specialized credit projects and programmes. In recent years, Ksh 1.3 billion (US\$80 million) has been pumped in through the New Seasonal Credit Scheme (since 1980) and Ksh 160 million (US\$ 10 million) in incremental development lending. In spite of the fact that credit markets in Kenya are relatively well developed, the performance of credit programmes in the agricultural sector has been very poor, both in terms of the amount of credit disbursed and the performance of the main government institutions responsible for managing the credit. The Government has recognized these difficulties and stated in the latest Development Plan (1984-1988) that the sector needed particular attention and reform during the plan period - this process is already under way with an evaluation of the agricultural sector by Government, supported by the World Bank.

Credit Institutions and Schemes

3. Five types of institutions provide credit to the sector:

- commercial banks,
- non-bank financial institutions,
- the Agricultural Finance Corporation,
- Cooperative Bank of Kenya and the various credit unions, and
- the crop supervisory institutions and input suppliers.

4. The proportion of financing for cash in 1984 is shown in the table below:

	Seasonal Loans	Loans	Total	Percentage of total credit outstanding
-----Ksh millions-----				
Commercial Banks	2,680	956	3,636	20%
Non-Bank Financial Institutions	-	1,175	1,175	12%
Agricultural Finance Corporation	200	1,034	1,234	100%
Cooperative Union Banking Sections	347	-	347	100%
Crop Supervisory Institutions, Input Suppliers	708	-	708	n/a
	3,935	3,165	7,100	n/a

-----  
Source: World Bank Kenya Agricultural Sector Adjustment Operation,  
June 1986.

5. In spite of Government's pressure on the commercial banks and non-bank financial institutions to increase their lending to the agricultural sector, including the requirement that they have a minimum of 17% of their loan portfolio allocated to the agricultural sector, there has been only limited response and that directed almost exclusively to large and very large-scale farmers. In general, the commercial institutions will not lend unless there is collateral and that for agriculture normally means a title deed to the land. This effectively rules out the largest part of the smallholder farming population and practically all of the livestock owners in the pastoral areas. In consequence, virtually no money is currently lent by these institutions to smallholder agriculture. This is unfortunate, because between them they have the largest branch network which together with mobile branches cover most parts of the country with the exception of the most outlying areas. the Kenya Commercial Bank, for example, which is the largest and possibly the most receptive to lending to the sector - owned 100% by Government - has over 250 branches, including 16 in ASAL districts:

<u>Town</u>	<u>District</u>
Mandera	Mandera
Hola	Tana River
Kilifi	Kilifi
Voi	Taita/Taveta
Wedani	Taita/Taveta
Kajiardo	Kajiardo
Loitokitok	Kajiardo
Kitui	Kitui
Machakos	Machakos
Kanjundo	Machakos
Embu	Embu
Meru	Meru
Kabinet	Baringo
Eldoret	Elgeyo-Marakwet
Lodwar	Turkana
Marsabit	Marsabit

6. The major public sector lender is the Agricultural Finance Corporation (AFC) with over Ksh 1 billion (US\$ 60 million) of credit outstanding (see table, para. 10) but, like the commercial banks, the greatest part of its lending has been to the larger farmers - eg. 66% in 1984. AFC is the only lender providing term credit for agriculture outside the non-bank financial institutions. However, in spite of massive support over the years from the Government and the World Bank, AFC's institutional and financial capacity to deliver and service credit effectively has not kept pace with the increasing demands made on the institution. It was observed by the World Bank's Agricultural Credit Policy Review that a number of factors led to this: (i) poor design of credit projects which AFC has been requested to administer; (ii) inadequate attention to loan quality and collections; (iii) interference of outside influence and non-credit criteria in loan approvals and enforcement of established collection procedures; and (iv) lack of strong financial management and the absence of a clear strategy for institutional development and operational objectives. In response to these problems, the World Bank, which currently has a senior advisor working full-time with AFC and is still the major external donor supporting AFC, has proposed the following measures: (i) upgrading the financial management of AFC; (ii) redefining and clarifying lending policies and priorities including the amalgamating of diverse credit schemes into one unified and consistent credit programme; (iii) with arrears estimated conservatively to be between 20% to 30%, strengthening efforts to collect from defaulters; (iv) streamlining loan procedures and improving general operational efficiency; and (v) allowing AFC greater autonomy in loan making decisions thus giving it the chance to become a truly financially responsible institution. A number of these recommendations are already being implemented and in a pilot credit management project involving a few branches improved procedures and management practices have already been introduced.

7. The Cooperative Bank of Kenya (CBK), which was established in the late 60s to serve the cooperative sector, has had considerable problems most of which can be traced back to the following factors: (i) the Bank has acted primarily as an arm of Government to channel credit funds in the form of some 20 different credit schemes with different interest rates and conditions; (ii) criteria for loan approval has often been based more on national production, social and political objectives rather than on economic/financial viability; and (iii) a general lack of credit discipline

greatly exacerbated by the multiplicity of schemes and conditions has resulted in high default rates, a build-up of debt in the cooperative societies and general confusion as to the direction and role of CBK as a credit institution. As of the end of March 1983, principal arrears on CBK's outstanding portfolio of Ksh 635 million (US\$50 million) <sup>1/</sup> were 65%. Three recommendations have been made to help improve the situation. First, CBK should operate according to strict financial criteria and while maintaining its links with the cooperative movement should operate within the provisions of the Banking Act. Second, the loan portfolio and credit schemes should be reviewed with the aim of reducing the number of schemes, standardising as much as possible the terms and conditions strengthening the collection of bad debts and concentrating lending on financially viable cooperatives. Third, the institution should establish a firm set of lending criteria and operational procedures.

8. In contrast to the generally pessimistic picture, CBK does have a very broad coverage with some 900 cooperative societies and does currently operate two very successful schemes, both supported by the nordic countries: the Rural Savings and Credit Project (RSCP) and the Urban Savings and Credit Project (USCP). The first which is the larger and more relevant to the ASAL Programme, has generated savings which by 1986 had reached Ksh 825 million (US\$50 million) out of which Ksh 380 million (US\$ 24 million) had been provided in the form of loans through cooperative societies. The scheme is operated directly with the societies with CBK only providing the capital.

9. The final category, the crop supervisory institutions and input suppliers, while only providing 10% of the credit represent an important and efficient credit channel. This was recognized in the Siaya Community and Farmers Group Project which is to channel credit through the Kenya Grain Growers Cooperative Union (KGGCU), ex. Kenya Farmer's Association. KGGCU together with the Coffee Board are the most important of these lenders to the agricultural sector with over one-third of the credit each, as the table below illustrates:

---

<sup>1/</sup> Exchange rate in 1983: Ksh 13 = US\$1).

(Ksh millions)	1980	1981	1982	1983	1984	1985
Coffee board	113.2	322.8	225.7	194.5	251.8	24.7
British American Tobacco	7.7	10.1	16.7	17.9	26.0	16.0
Cotton L&S Mktg. Board	n/a	n/a	n/a	18.6	13.4	7.7
National Irrig. Board	n/a	21.4	26.7	44.2	34.4	53.5
Oil Crop Dev. Ltd.	0	0	0	15.1	27.3	31.5
Sugar Companies	39.1	42.2	60.2	90.3	102.0	45.0
KGGCU	80.3	146.6	145.4	205.2	253.6	232.1
Total	240.3	543.2	474.7	585.8	708.5	410.5

10. A summary of the lending in terms of credit outstanding, which is provided below, shows that credit has expanded by 43% over the period 1980 to 1984. However, only a small part went to the small farm sector - 35% in 1984.

(Ksh millions)	1980	1981	1982	1983	1984
Commercial Banks	2,078	2,306	2,821	3,812	3,636
Non-Bank Financial Institutions	163	311	780	1,012	1,175
Agric. Finance Corp.	874	1,092	1,074	1,110	1,034
Coop. Union Banking Sections	n.d.	n.d.	209	269	347
Crop Supervisory Institutions, Input Suppliers	240	543	479	586	708
Total	3,355	4,252	5,363	6,789	7,100
Index (1980 = 100)	100	112	131	152	143

#### Recent Trends

11. Agricultural credit is definitely a priority area for Government. A number of initiatives are underway, or have been completed, which if successful should help to improve the efficiency of the sector and its ability to reach the smallholder farmer. Following the World Bank's Agricultural Credit Subsector Review and Industrial Finance Review, which were complemented by position papers on the future roles of AFC and CBK, the Government held a forum in November 1985 to discuss policy issues. Coming out of the forum were the following goals:

- to improve the financial discipline of public sector schemes so as to use limited resources in an optimal fashion;
- to promote credit supply to smallholders as part of the Government's smallholder intensification strategy; and
- to increase credit availability in agriculture and to allocate it in an optimal fashion by relying on market channels and signals.

12. In conjunction with the World Bank's Agriculture Sector Adjustment Loan, a number of measures are proposed to improve the performance of agricultural credit:

a) Improving Public Sector Credit:

- reform of AFC and definition of its future needs; key among the proposals is to convert AFC into a deposit taking institution which would have the advantages of mobilizing increased resources for AFC, helping develop a better and financially more sound relationship with its clients and helping AFC to be more efficient through competition with private banks.

b) Promoting Smallholder Credit:

- with only 1% of farm families currently receiving credit, Government wants to improve smallholder accessibility to credit by reforming cooperative credit and consolidating the numerous credit schemes and providing more information on credit through the national extension system (T&V).

c) Relying on Market Channels and Signals:

- rationalization of interest rates including bringing into line AFC's rates which at 12% are below market rates for comparable lending (14% to 19%); and
- promoting commercial lending to agriculture partially by encouraging some donor funds to flow through commercial intermediaries to farmers.

B. Credit for ASAL Areas

Rationale

13. Financial support for micro-project development in ASAL areas as well as in the rest of the country is almost totally on a grant basis. Both the RDF and EEC Micro-Project Fund provide their support on a grant basis. While this can be largely justified as another channel for funds to benefit the rural population and as long as a major portion of the funds come as grants from donors, there is little pressure to change it. However, the fact remains that a number of the projects not only provide benefits to the recipients but also help to increase their income, directly or indirectly. Repayment or partial repayment in these cases would be possible and would help introduce a better discipline into the system while at the same time being a more equitable way of allocating resources. A supplementary but important argument for credit is that payment for a service or an item, such as a cattle dip, has proven psychological benefits in that the recipients thereafter view it as theirs and thus tend to maintain it better. But in the longer run the most important argument for introducing a credit element into a fund which must be managed by the Government, primarily from government



budgetary resources, is that credit would create cost recovery thus reducing the drain on the budget and allowing the Fund's resources to be spread further.

14. The formula for providing credit would have to be worked out in detail with the credit agency or agencies during preparation, but it is worth noting now a few points that would appear to be of particular relevance. First, the majority of the potential recipients would have no collateral in any form, would not have title deeds to land and would not be members of a formal cooperative society. Thus, the problem of loan security would have to be addressed in a different manner than in most of the credit schemes in the country today. Second, experience has shown that even in the poorest areas, when beneficiaries need and want something badly enough, savings can be generated, sometimes to the point that little or no credit is necessary. Third, if recipients of credit achieve the production increases or other benefits forecast, the repayment of the credit is much more readily forthcoming. This implies good technical follow-up of projects. Finally, strict credit discipline needs to be introduced from the start if the credit scheme is to be sustainable. Taking these four points into account and looking at the past credit experience in Kenya, strongly suggests a savings/credit approach incorporating closely coordinated technical support. This approach is discussed further below.

#### Credit Requirements

15. It is not possible to assess the demand for credit at this time but it is clear that the ability to repay credit would limit the type and number of projects that could be supported. In fact, the prime emphasis should be on savings as complementary to self-help labour contributions rather than on credit itself. Credit should only be extended where really needed and only then in combination with savings. Of the different micro-projects that would qualify for funding, four (?) basic classifications can be considered: (i) water management/soil-water conservation projects; (ii) livestock production and marketing projects; (iii) off-farm income-generating projects and (iv) rural infrastructure projects. Representative models or sample projects are described for each of these groups in Annex 11.

#### Credit Mechanism

16. If one looks at the alternatives for channelling credit to the potential beneficiaries of the micro-projects described above, four options can be examined: commercial banks and non-bank financial institutions, the Cooperative Bank of Kenya (CBK), the Agricultural Finance Corporation (AFC) and a new facility within the district administration.

17. The first option would, if it were possible, be the most attractive. The banks and financial institutions have the widest coverage, the best loan discipline and are efficiently run on strict financial principles. But, it appears from discussions in country extremely unlikely that any of these institutions and especially any of the three major banks - Kenya Commercial Bank, Barclays Bank and Standard Bank - would be willing to take the lead unless they were given a 100% guarantee to cover risk. Even then, it is doubtful that they would accept unless considerable pressure was put on them. Even if one accepted, it is questionable if a bank with its conservative approach to lending could operate in such a sector, service the diverse types of groups/communities and still maintain their loan

discipline. The lack of experience with agriculture and especially smallholder agriculture and absence of any formal links with the government support services, needed to ensure that the projected returns would be achieved, would prejudice against the involvement of the private banking sector.

18. The CBK and in particular the Rural Savings and Credit Project (para. 8) would appear to fit the requirement very well. They have considerable experience with the sector, very wide coverage through their 900 cooperative societies (albeit much less in the ASAL areas), and currently operate a successful scheme based on savings as the driving force. But, while it might not represent an unsurmountable obstacle, the requirement that borrowers (and savers) be members of cooperative societies in order to qualify is a constraint which would currently block this option. The fact that the Rural Credit and Savings Project wants to maintain a conservative and gradual growth could also present problems if the ASAL areas were not considered as a priority zone. Nevertheless, the option warrants further investigation.

19. One of the most promising alternatives, at this time, would be to develop a new credit scheme within the framework of the reorganized and strengthened AFC. This would take advantage of the large spread of AFC branches in ASAL areas (see following table), capitalize on AFC's broad mandate in the agricultural sector and allow possible linkage between production, credit and the ASAL Fund term credit. However, there are two problems to overcome: first, at present AFC has no savings operation and second it could be difficult for AFC to lend for off-farm income-generating activities.

## ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

## AFC Branch Statistics -- ASAL Districts

District	Branch	Staff (3.3.86)		No. of Borrowers	Loan Portfolio (3.3.86)		Total
		Technical	Others		AFC	SCC*	
Mandera	Wajir	3	-	-	-	-	-
Gariisa	Gariisa	-	-	-	-	-	-
Tana River	Garsen	3	6	313	30,222	54	30,276
Lamu	Garsen	3	10	414	26,423	692	27,115
Kilifi	Kilifi	4	6	724	20,600	701	21,301
Kwale	Ukunda	3	9	202	64,274	36	64,310
Taita Taveta	Voi	6	13	549	47,023	32	47,055
Kajiado	Kajiado	4	8	812	49,732	2	49,734
Narok	Ngong	4	11	1,940	26,837	228,525	255,362
Machakos	Machakos	7	13	1,849	64,496	2,704	67,200
Kitui	Kitui	-	-	-	-	-	-
Embu	Embu	4	8	746	8,971	16	8,987
Meru	Meru	4	12	1,524	16,155	4,859	21,014
Isiolo	Chogoria	3	4	531	10,328	25	10,353
Turkana	Meru	-	-	-	-	-	-
W.Pokot	Marsabit	2	4	200	3,973	8	3,981
Baringo	Kapenguria	3	5	321	145	3,541	3,686
Samburu	E/Ravine	4	9	1,258	17,220	6,000	23,220
Elgeyo Marakwet	Kabarnet	1	4	678	5,153	1,905	7,058
Laikipia	Maralal	3	7	228	11,807	851	12,658
	Iten	6	7	1,715	8,105	10,806	18,911
	Nanyuki	4	11	852	26,057	20,206	46,263
	Nyahururu	5	10	4,161	28,041	46,407	74,448

Note: Where there is dash - Information either does not exist or is not available.

\* Seasonal Crop Credit (mostly maize and wheat)

20. The final option, to create a special credit facility within the district administration, probably within the ASAL Fund itself, appears to be the best solution. One could tailor the credit directly to the needs of the Fund and with both the grant and credit portions under the same management, the processing of financial support for micro-projects would be greatly facilitated. However, there is one major and overriding constraint: the district administration has no expertise nor experience with credit administration and there is no insuring that an efficient and disciplined credit operation could be created. The only possibility that might justify further investigation is for the ASAL Fund to divest itself of the majority of the administration of the credit and contract it out to a private bank or banks. The banks would maintain the savings operation; the credit which would be disbursed almost totally in kind would be organized through the government system in the same way as the RDF grants are handled (approval for credit disbursement would require documentation from the bank that a certain level of savings had been reached), and the bank(s) would be the receptacle for credit repayment. The problem comes in those cases when the credit payments are not made as stipulated; this raises the associated question, to what extent would the bank(s) bear the risk. A secondary constraint would be the necessity for training a cadre of efficient financial managers at the district level - to an extent this already exists, is already required to handle the management of RDF grants and could be strengthened. Again this option warrants further study with the reservation that it should be done to the greatest extent within the existing structures, without creating any new institutions.

21. None of the above alternatives provides the ideal solution. Possibly a combination of them would provide the most flexible approach but considerably more investigation would have to be made of each and detailed discussions held with the key officers in the institutions and in the Ministries of Finance and Planning and National Development before a decision could be made.

CREDIT

Terms of Reference

Object: - To prepare a paper highlighting the place of credit in developing the ASAL areas of Kenya.

Qualifications

- minimum of 10 years experience in the sector.
- familiarity with savings and credit schemes in Kenya or similar countries in Africa.

Assignment

- review the recent credit history in Kenya paying particular attention to smallholder and agricultural credit.
- review the experience of the Rural Development Fund and the EEC Micro-Project Fund.
- hold meetings with the key credit institutions including inter alia, the Agricultural Finance Corporation, Cooperative Bank of Kenya, KGGCU, Kenya Commercial Bank, Barclays Bank, Standard Bank, non-banking financial institutions and private enterprises such as the input suppliers.
- hold discussions with key officials in relevant ministries, the Office of the President, the Control Bank and district administrations.
- assess the potential for using a savings/credit approach and the success and applicability of savings/credit schemes currently under implementation in the country.
- propose what procedures and type of administration would be required to ensure that the grant and credit portions of the ASAL Fund operate effectively and that the credit is efficiently channelled to the beneficiaries and collection mechanisms are in place.
- determine the implications of the credit and grant facility of the ASAL Fund on government budget ceilings and the effect of government procedures at the district level on operation of the ASAL Fund.

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APPENDICES

1. Terms of Reference
2. Climatic Data

KENYAARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENTACRONYMS

ALDEV	= African Land Development
AMRE	= African Medical Research Foundation
ARID	= Arid and Semi-Arid Lands Development
BPSAAP	= Baringo Pilot Semi-Arid Areas Project
EPAP	= East Pokot Agric. Project (Diocese)
EMI	= Embu/Meru/Isiolo
IDB	= Irrigation and Drainage Branch
LDD	= Land Development Division
LU	= Livestock Unit
LTVIP	= Lower Tana Village Irrigation Programme
KIE	= Kenya Industrial Estates
MOA	= Min. of Agriculture
MOH	= Min. of Health
MLS	= Min. of Land Settlement
MLD	= Min. of Livestock Development
MOWD	= Min. of Water Development
NCCCK	= National Christian Council of Kenya
NIB	= National Irrigation Board
NGO	= Non-Governmental Organization
ODA	= Overseas Development Authority
PVC	= (piping)
PIU	= Provincial Irrigation Unit
SIDA	= Swedish International Development Authority
SSIDP	= Small-Scale Irrigation Development Project
SWCB	= Soil and Water Conservation Branch
STAESU	= South Turkana Agricultural Extension & Support Unit
TA	= Technical Assistance
TO	= Technical Officer
TRP	= Turkana Rehabilitation Project
UNDP	= United Nations Development Programme
WB	= World Bank

KENYA

ARID AND SEMI-ARID LANDS DEVELOPMENT

WATER DEVELOPMENT

I. INTRODUCTION

1. This Annex describes water development in the ASAL areas in its widest sense, from domestic and livestock water supplies to water harvesting and small-scale irrigation for agricultural development. Existing experiences of Government and donor funded development programmes are described and different technologies are discussed. Constraints and problems, and successes and failures have been highlighted. The potential for future development has been suggested together with issues that need to be addressed. Options for several low cost appropriate technologies have been analysed and recommendations on future investment opportunities have been proposed.

2. The ASALs have benefitted from several development programmes, particularly during the last decade, including domestic and livestock water supplies, water harvesting technologies, development of suitable technologies for dry land farming and establishment of irrigated cultivation, especially among the destitute pastoralist populations. However, there have been no economically important technological breakthroughs for rainfed crop enterprises. There have also not been any successes in establishing self-sustaining irrigation schemes; instead many schemes have represented extremely expensive experiments based on heavy government support programmes, costly water-lifting technologies and paternalistic management systems. Nevertheless, there has been some success in the development of water supplies but the pace of implementation has been slow.

Agro-climatic Zones

3. The ASAL areas are primarily located in Agro-ecological Zones V to VII where rainfall/evaporation ratios ( $r/E0$ ) are less than 40% and the agricultural potential ranges from 'marginal' (zone V livestock with millet and sorghum) to 'low' (zone VI ranching) to 'very low' (zone VII pastoralism). See map 4, Annex 8.

Rainfall

4. More than two-thirds of Kenya's land area is either arid or semi-arid with less than 750 mm of annual rainfall - see Figure 1. The climate is largely influenced by its equatorial location and the monsoon winds controlled by large-scale pressure system along the east coast of Africa. Between March and May and October to December monsoon winds blowing off the Indian Ocean bring maritime air and rainfall to much of the country. The reliability and amount of rainfall varies greatly throughout the country. In parts of Turkana in the north mean annual rainfall is less than 250 mm, while in highland areas near Lake Victoria in the West rainfall means exceed 2500 mm. In the wettest areas rain falls throughout the year although, April, the middle of the "long rains" is generally the wettest month. Along

the coast January to March are generally the driest months. Despite the concentration of rainfall in brief but normally predictable seasons, the variation is high and frequent periodic droughts occur with serious consequences for agriculture, especially in the ASAL areas.

#### Climate

5. The ASAL climate is hot and dry and governed by the following general features:

- Elevation. Sea level to 1900m but generally between 200m and 1000m.
- Average annual temperature range: 16°C to 29°C.
- Average annual maximum temperature range: 23°C to 35°C.
- Windspeed annual average (2m) 0.8m/s to 3.8 m/s.
- Sunshine %: 55 to 81
- Evapotranspiration per annum: 1170mm to 2213mm.

6. The data for the following stations are listed in Appendix A of this Annex: Lokitaung, Lodiwar, Mandera, Marsabit, Maralal, Wajir, Isiolo, Garissa, Narok, Magadi, Kitui (Agric.) and Machakos.

#### Surface Water Resources

7. Kenya can be divided into five main catchment areas: Lake Victoria, Rift Valley Basin, Ewaso Ng'iro Basin, Tana Basin and Athi Basin. With the exception of Lake Victoria, all the catchments are in the ASAL areas. Kenya's main surface waters commence their flows at high to moderate elevations. As the rivers descend into lower elevations in the ASAL areas flows become very erratic and their regimes unstable. Many of the streams and rivers in the ASAL areas are ephemeral and are subject to flash floods which are caused by deforestation in the upper catchments. As a consequence, these floods carry large silt loads.

#### Hydrogeology

8. The groundwater potential in Kenya is very variable and available data does not give complete coverage. Wells and boreholes have nevertheless provided reliable water supplies throughout the country for many years. However there are indications that water tables are gradually dropping, especially in the high potential zones. This disturbing fact is not fully understood at present. Water resource assessment studies are being undertaken in each District by the Ministry of Water Development (MOWD) with support from the Netherlands Government.

9. In the ASAL areas the groundwater resources are very mixed with variable depths of water table and water quality. In some areas supplies are saline and unsuitable for human or livestock consumption while in others the supplies are excellent. In general, groundwater resources in the ASAL areas are considered to be reasonable based on the knowledge to date. As more boreholes are drilled and data is logged the knowledge will improve. Also better methods (resistivity) are being used to locate groundwater.

### Wind Energy Potential

10. The average monthly and annual wind speeds have been determined by the Meteorological Department over the past 10 years for 26 stations. Detailed data were available on 8 of these stations to estimate energy content of wind on a month to month basis. The wind speeds applicable to 12 stations in the ASAL areas are given in Appendix A. Although the quality of the present data as well as the number of stations cannot provide definite conclusions, indicative values of wind energy potential are shown in Figure 2. Areas where the wind speed is in excess of 5m/s are expected to have good potential for windmills. This information has been provided by GBE Moerman (Ref. 1) and SWD (Ref. 2).

### Solar Energy

11. Solar energy potential in the ASAL areas is extremely good. Much of the area has sunshine in excess of 8 hours per day on average. Pumping from boreholes and wells using solar energy is being undertaken at several locations and as the cost of solar panels decreases with time, so the scope for harnessing more solar energy will increase. See Appendix A and Figure 3.

## II. DOMESTIC AND LIVESTOCK WATER DEVELOPMENT

12. The Government of Kenya has recognised that affordable and sustainable progress in the development of rural water supplies depends on adoption of appropriate low-cost technologies. Principal sectoral objectives of the 1984-88 Development Plan are:

- Provision of safe potable water to all rural and urban areas;
- Management and development of water resources;
- The adoption of water distributive practices and water pricing policies;
- Provision of incentives for efficient water use;
- Recognition of the principle of 'cost sharing' so that users make contribution towards provision and maintenance of water schemes.

13. The action programme indicates that 30% of the population (3.5 million) had access to water supplies in 1983 and it is hoped that this should rise to 5.5 million by 1988. The stated aim of GOK, is that water be supplied through communal water points and the walking distance should not exceed 1 km in the marginal zone V areas. In the low potential zones VI and VII, which comprise most of the ASAL area, water should be supplied from communal water points and the walking distance should not exceed 5 km.

A. Ongoing Development Activities

Agencies involved

14. Three major groups are involved in the water sector:- the Government of Kenya through the Ministry of Water Development (MOWD), Multilateral and Bilateral agencies, and NGOs.

The Ministry of Water Development (MOWD)

15. The MOWD is responsible for the design, construction, financing, operation and maintenance of rural as well as urban water supply schemes and presently administers several hundred rural and urban systems combined. In the rural areas the ministry has two programmes: Rural Water Supply Programme and Self-Help Water Programme.

16. Since MOWD was created in 1974 it has undertaken major development projects to improve water supplies, in both rural and urban services. In spite of these efforts giving a total country coverage of approximately 30% the rural coverage has been extremely low. In a report in 1983 MOWD indicated that rural schemes provided coverage for only about 4% of the estimated rural population. Highest levels were in Central Province with 8% then Eastern Province 5%, Western 3.3%, Coast 3%, Nyanza 2% and the Rift Valley 1%. Although not yet documented it is understood that present levels have not significantly changed from those above. In view of the predicted population growth in the next 20-30 years, new projects will have to be implemented at a faster rate compared with the past if the people are to have access to safe water to meet the Government's targets.

17. In general, community requests for assistance with water supplies are made through the normal channels of the District Development Committees. Upon approval, MOWD then provides support in the form of materials, money, and technological expertise and may also play a leading role in the implementation phase. These self-help projects generally employ low-cost technology such as spring protection, small dams, wells, gravity fed systems and rainwater collection.

18. In an average year, the MOWD will receive several hundred requests for self-help projects but usually less than 50% are fully supported, although all may receive technical design support. The MOWD is also responsible for livestock water supplies particularly in the ASAL areas and has a range management division.

19. During the 1984-88 period some 62 million Kenyan pounds' (US\$77.5 m) has been allocated for the implementation of over 200 new rural water supply systems as well as for the rehabilitation of 40 existing schemes. In addition the rural self-help programme is to receive 18 million Kenyan pounds (US\$22.5 m). A new programme amounting to 7.2 million Kenyan pounds (US\$9 m) is also planned for ranch water development in Marsabit and Tana River.

20. Other government agencies which are involved in the water supply sector include the Ministry of Land Settlement (MLS), the Ministry of Agriculture, (MOA) the Ministry of Livestock Development (MLD) and Ministry of Health (MOH).

#### Multilateral and Bilateral Donor Agencies

21. There are many programmes being undertaken in the ASAL areas which are being sponsored by donor agencies. Some have recently been completed, many are still ongoing and several are about to commence. In nearly all programmes there is an element of domestic and water supplies. In Table 1, the status of some of the present activities are given.

22. These are summarized as follows:

- There are at least 12 donor agencies working in some 14 ASAL districts.
- Programmes generally run for 3 to 4 years and the majority has been extended to a second stage.
- The largest programmes, ranging in annual costs from US\$1.29 m to US\$3.12 m, occur in only four districts, Turkana, Kitui, Baringo and Machakos.
- In the remaining 11 districts the annual budgets range from US\$0.04 m to US\$1.18 m.
- Activities range from wells to boreholes, sand dams, gravity supplies, roof catchments, rock catchments, springs, pans and dams.

#### Non-Government Organizations (NGOs)

23. There has been a high success rate of water projects amongst some of the more efficient NGOs in Kenya which has probably been related to the high degree of community participation involved. The fact that the implementing agency has both experience working with the communities and a long-term commitment also adds to the success of the project. Most of the more effective groups seem to be dominated by development conscious Kenyans who are the ones most likely to bring about meaningful, lasting changes in the future.

24. Possibly the most effective NGO in Kenya at the present time is the Catholic Church which has development offices in all the diocese in the country. The Catholics, like almost all other NGOs, use self-help labour as an integral part of every project. This reduces the cost while at the same time automatically encourages community involvement. Among the projects which the Catholic church has been successfully involved with, are the construction of medium and small-scale piped water schemes, using both gravity flow and pumped supplies, as well as roof catchment tank programmes in Nairobi, Kitui and Machakos, among others. In Lodwar and in Marsabit handpumps have been installed as part of a shallow wells project. Among the other church NGO's working in the sector are the Lutherans, the Baptists, the NCCCK (National Christian Council of Kenya), the African Inland Mission and the Anglicans. The main non-church groups working in the sector are Care Kenya, Water for Health, AMREF (African Medical Research Foundation), Action aid, Plan International and Freedom from Hunger Campaign.

25. One group of very informal NGO's working in the water sector which should not be overlooked are the hundreds of self-help "Mwethya" groups which have been set up by the communities themselves. A few of these, such as the Utooni Development Trust at Kola, Machakos district, have formal links with larger organizations. Most, however, work more or less independently raising their own funds within the community and embarking on

their own projects. These groups, are generally anxious to receive a limited amount of external technical assistance and advice, and probably represent the most likely vehicle for true grass roots development. Participation with these groups, especially those which are better organized, should result in a reasonable success for any viable well designed and well planned water project.

#### Available Technology

26. There is a considerable range of technology in Kenya today which has been adopted in different regions with varying degrees of success. The technology has been used to meet three different methods of water abstraction namely: Surface water, shallow subsurface water and groundwater.

27. Surface water. Historically Kenya has concentrated on obtaining its water supplies from surface structures harnessing direct rainfall and run-off. Closest to the home are roof catchments which collect rainwater from roofs into various forms of containers. Increasingly traditional thatched roofs of dwellings in the semi-arid and to some extent the arid areas are being replaced by corrugated iron sheeting. This surface improves run-off considerably and is ideal as a rainwater catchment. The quantities of water which can be stored is a function of the amount of rainfall the owner's income, the size of his family, the length of the dry season and the availability of other nearby water supplies. Considerable progress has been made in Kenya in recent years on roof catchment storage. School and community centre roofs provide particularly good and large rainwater collection areas. There is a wide range of tanks available ranging from oil drums, galvanised iron tanks, ghala baskets, ferrocement tanks and underground tanks. Cowater (Ref. 3) presents comparative unit costs for different tanks - see Table 2. General observations include:

- The cost/m<sup>3</sup> is extremely variable ranging from 20/- to 6000/- (US\$1.25 to US\$375) for ghala baskets.
- Availability is a constraint to selection.
- Portable tanks only go up to 10 m<sup>3</sup> in capacity.
- Well-constructed tanks involving cement can have lives of 10 to 20 years whereas galvanised iron tanks can rust and leak in less than 5 years.
- Tanks built in the ground have the advantage of being simple to construct by self-help and are cheap (150-450/- per m<sup>3</sup>) (US\$9 to US\$28).
- Ferrocement tanks are also improving in technology and popularity.
- The range of technology does indicate that water storage is possible for many different conditions.

28. Rock Catchments are only suitable in certain of the ASAL Districts where rock outcrops exist. This is mainly confined to Machakos, Kitui, Embu Meru, Isiolo, Laikipia and Samburu. Ideal sites are dome shaped rocks where diversion walls can be constructed so that water can be channelled into a tank. These structures can be relatively cheap and constructed by self-help. Rainwater harvesting comes into this category except that the impermeable apron has to be constructed of concrete, asphalt or compacted dung and can be a costly solution. This method is used on several of the islands off Kenya's east coast.



29. Pans and Tank Dams: Many hundreds of small pans and tank dams have been built over the years notably in ALDEV <sup>1/</sup> times. Many of these have silted up and are no longer useful as water points. Silting up has occurred through denudation from overgrazing, deforestation and shifting cultivation. Many of the current ASAL Programmes (see Table 1) include pan or dam rehabilitation by desilting and, in some areas, care is being taken to reduce siltation by soil conservation (self-help groups in Kitui). Desilting operations by mechanical means are generally expensive and hand labour and ox-drawn dam scoops are being tried in several places (Kitui) with variable success. Apart from siltation, the biggest disadvantage of pans and dams, particularly in the ASAL areas, are:

- Erratic and limited rainfall/run-off to fill them;
- Long dry periods between rainfall;
- High evaporation losses;
- Seepage losses;
- Damage from flooding;
- Contamination and health hazards.

30. In the first livestock development project (WB) in NE Province the condition of livestock pans five years after they were built was stated to be extremely poor. Out of 72 that were built some 12 had been washed away, 38 silted, and half of them eroded. The design storage was 625,000 m<sup>3</sup> and the actual storage was only 67,000 m<sup>3</sup> representing an efficiency of only 11%. Pastoralists have also contributed to the failure by refusing to maintain fencing, not using troughs which have been provided and instead of watering anywhere, and allowing animals to contaminate what little water there was. The blame was then put on outsiders but despite this, the problems of water control were still the same as those voiced 12 years previously. This situation has been confirmed by the Range Management Report of 1984. In the Second Livestock Development Project Performance Audit Report (WB) it was also reported that the benefits from improved range water supplies had not been sustainable on account of poor maintenance and ineffective management.

31. Diversion Channels and Gravity Pipelines are only effective in areas where there are perennial streams. These are generally in the marginal potential semi-arid zones such as Meru and Embu, on the slopes of Mt. Kenya, the slopes of Mt. Kilimanjaro and the Kerio valley. Gravity canals have been built for great distances. The disused canal for the Mitunguu scheme from the Thingithu river for example has been extended under the ODA EMI programme for some 40 kms. and has been constructed by self-help. For this type of water supply it is important that users adhere to strict codes of practise by using water for domestic purposes only and prevent contamination. Gravity supplies require the simplest of technology and are particularly attractive to self-help groups. Maintenance is minimal. Technical assistance is normally required for river diversion works and line and level for channels or pipelines.

<sup>1/</sup> African Land Development Programme.

32. The MOWD have constructed numerous gravity pipeline schemes in many areas. Types of pipeline depend on site conditions and include PVC, asbestos-cement, and galvanised and cast iron. PVC piping is manufactured in Kenya.

33. Hydraulic Rams and Turbine Pumps. Where perennial streams are too deeply incised for gravity supplies to be possible, hydraulic rams and turbine pumps are possibilities. Both types of pump which rely on stream flow for pumping energy, generally require little attention or maintenance when once they have been installed. Both types of pump are manufactured in Kenya.

34. Subsurface water in river beds and areas where water tables are close to the surface provide the most common source of water throughout Kenya. Such sources are typically exploited by shallow open hand dug wells which are widely used. These are mostly simply constructed by self-help labour and in many cases are unlined and prone to contamination. Many programmes, as shown in Table 1 include for rehabilitation of these wells by deepening, lining, capping and providing a handpump, so that supplies are clean and uncontaminated. Many new shallow wells have also been constructed in recent years. The average cost for a well which has been lined and fully equipped with hand pump is estimated to be 33,000/- (US\$2,060) serving a community of about 200.

35. Throughout the ASAL areas many river and stream beds have large quantities of sand and silt which contain considerable volumes of water when surface flows have ceased in the dry season. Where a natural rock bar occurs the sand beds upstream generally provide particularly good water supplies which in many cases are clear and uncontaminated. The stored water is protected from evaporation loss which is a big advantage over surface water supplies. In situations where no natural rock bars exist, subsurface dams have been constructed. These consist of a trench dug across the riverbed and an impermeable membrane (concrete, polythene) built to create storage in the sand behind it. A well is then normally constructed upstream of it. A variation of similar technology is the sand dam which involves the construction of a weir across a suitable rock bar. The volume behind then silts up. The advantage of this method over subsurface dams is that wells can be constructed in the dry and feed pipes laid to the well before siltation takes place. Also a gravity supply is possible downstream of the weir. The big constraint to subsurface and sand dams is the small water-holding capacity of the sand (about 25%-30%) which means larger volumes of storage are needed compared with open storage. However damage from flooding is minimal and maintenance is low. These structures are popular and can be built by self-help. Costs are generally in the order of 132,000/- (US\$8,230) which includes a fully equipped well.

36. Groundwater. Although boreholes have been drilled throughout the country for many years, the extent of the groundwater potential has not been fully assessed. GOK, under a programme sponsored by the Netherlands Government, are currently undertaking groundwater assessment programmes in each district. It will take some time for all the ASAL areas to be covered.

37. Boreholes are however, generally costly and do not come in the low-cost technology category suitable for self-help projects. Nevertheless, in many of the ASAL regions boreholes provide the only source of reliable water supply, especially for livestock. From an updated 1983 inventory of the wells excavated in the last 50 years in eighteen districts of the ASAL areas, it was shown that about 60% (or 927 out of 1,557) were dry or salty

or had a yield below 1 m<sup>3</sup> per hour. The remaining 630, with an average depth of about 80 m, had an average yield of 6 m<sup>3</sup> per hour. Assuming average conditions and limiting to 30% the failures for dry wells, salt water and low yield, the average investment cost of the groundwater exploitation was of the order of Ksh 700 (US\$44) per LU and the maintenance and operational annual cost of about Ksh 50 (US\$3) per LU.

38. Water Abstraction. Substantial efforts are being made to produce a hand pump which is cheap enough for beneficiaries to purchase and requires little or no maintenance.

39. In the SIDA/World Bank/UNDP/MOWD project at Kwale, trials for several hand pumps are being undertaken. A number of handpumps are currently in use in Kenya which include those listed in Table 3. Information has also been derived from Arlosoroff et al (Ref. 4).

40. Hand pump costs range in cost from 3500/- (US\$220) to 9400/- (US\$590). The most extensively used at present is the India MK II which is manufactured locally under the name of WECO. Other makes such as the Dutch SWM 80 and 81, the Finnish Mira, the Dempster and Malawi Malder are also being used with varying degrees of success.

41. Hand pump capacities are generally in the range of 1500-2000 l/hr. With an average consumption of 25 l per person per day, a single handpump can support some 300 to 400 people. When provision has to be made for watering livestock, greater quantities have to be pumped than can be supplied by handpumps. Hence in the ASAL regions when water is primarily required for livestock, mechanical pumping has to be used. This is generally in the form of diesel generators operating submersible pumps or direct diesel drive pumps. Problems with availability of fuel supplies, maintenance and lack of spares are serious constraints to diesel motor pumping. In spite of these constraints diesel power is used extensively but many water points fall into disrepair and are abandoned.

42. Wind energy potential is a resource in ASAL which so far has not been adequately used. Windmills were first introduced to Kenya at the beginning of the century and in the 60s some 100 were imported from Australia. They fell into disuse when diesel pumps became relatively cheap to use. Nevertheless, there is a demand for windmills in Kenya which is demonstrated by the fact that there are three local manufactures: Bobs Harries Engineering at Thika (the Kijito windmill), KIE Technical services at Kisumu and Pwani in Mombasa. Bobs Harries is by far the largest and concentrates on lifting water from deep wells, whereas the other two are concerned with low lift pumping. Bobs Harries claims that the low annual operation and maintenance costs of 700/- per annum more than offsets the high capital outlay. Evidence so far suggests that maintenance is a problem and that more time is needed for testing to substantiate the manufacturer's claims. A low cost windmill which requires little operation and maintenance still needs to be identified and developed for Kenyan conditions. However it is reported by GBE Moerman (Ref. 1) that there are many windmills operating in Kenya at present in Turkana, Isiolo, Laikipia and Coast Province. The Intermediate Technology Development Group, who are working closely with Bobs Harries, have reported that at least 100 units installed over the last 6 years are operating successfully in the ASAL areas. They are designed for a 20 year life and have an automatic self protection by shutting off in strong winds. The only maintenance required is greasing twice a year. Demand is reported to be increasing.

43. An alternative resource to wind energy is solar power which is abundant especially in the lower elevation of the ASAL. At the present time the cost of pumping with solar energy is high, but the cost of solar panels is decreasing sharply each year. In Kenya, the use of solar power is still in its infancy and so far only units for pumping water at low heads have been used. Several solar power units have been installed at mission stations, notably at Merti in Isiolo and in Turkana. Protection rather than maintenance appears to be the biggest problem. No solar pumps and panels are made in Kenya.

44. Animal power is the other vast untapped resource for pumping water. This method has been known in Kenya and tried some years ago but the provision of enough feed for draught animals is understood to have been the major constraint facing the wider adoption of this technology. Although techniques have been used in other countries for centuries, the nomadic pastoralists in the ASAL areas have never put their animals to work, apart from some load carrying. With the increase in the numbers of camels and cattle great use could be made of their power to lift water by suitably adapted pumps.

#### Comparative Costs of Water Supply Projects

45. Cost estimates for different water supply technologies have been prepared, based on discussions with donor agencies, the MOWD and the private sector. Where costs for a particular technology have been obtained from different sources an average has been taken. In several cases the range of costs has been wide and in some cases only one cost has been obtained, however a summary has been compiled which gives an indication of the comparative costs between one type of technology and another. These comparative costs are shown in the table below. The assumptions made to derive the cost per person or livestock unit have been based on:

Domestic consumption	25 l/day/person
Livestock consumption	20 l/day/light animal
	40 l/day/cattle
	25 l/day/average for overall livestock units
Yield from water points	based on capacity which is site specific

Comparative Costs of Water Supply Projects  
(US\$)

Item	Av. Cost	Cost/Person	O and M Cost/P/yr.
Shallow wells fully equipped with hand pump	2,060	10.3	0.3
Springs & Storage Tank	1,060	5.6	neg.
Pans (tank dams)	31,250	14.4	Desilting every 3-5 yrs.
Subsurface/sand dams with well and handpump	8,250	21.3	0.3
Rock Catchments & tank	21,380	15.0	0.3
Earth Dams	181,250	31.3-93.8	0.3
Hydraulic Rams or turbine pumps & Delivery piping & tank	2,750	9.6	0.3
Gravity water supply offtake pipeline	62,500	12.5	neg.
Roof collection tanks	see table at para. 35	12.5-62.5	neg.
Rainwater harvesting unper- meable 1000 m2 apron & tank	21,880	62.5	neg.
Shallow drilled wells with hand pump	6,300	15.6	0.3
Borehole & diesel generator & submersible & storage tank	47,380	8.5	3.4
Borehole & windmill & storage tank	27,190	27.2	0.3
Borehole & solar power & storage tank	36,060	18.8	neg.

47. It has been the fastest growing Ministry and many of its problems are due to this rapid expansion. A major constraint is the lack of qualified and well trained staff at all levels. The Ministry has found it difficult to attract and hold competent individuals due to more attractive conditions in the private sector and the absence of a good career plan for staff. This has been reflected in poor planning and design of water supply projects. For example, in the development of pans for watering livestock, site specific data is not always used and the same general sketchy design is repeated all over the country. Useful design information available in other Ministries is not used by MOWD, because of the difficulties in establishing efficient cooperation between Ministries. In the case of livestock water requirements, no regard is paid to stocking rates, state of grazing conditions and the frequency and distribution of water points. Closer cooperation with the Ministry of Livestock would provide some of the answers to these problems.

48. A similar situation arises with the proliferation of many small projects which emphasize a user-participatory approach. Many projects are planned but are never started due to lack of funds, while other projects get started but are never completed either because of a lack of materials, shortage of money, decrease in user interest or technical design difficulties.

49. Many Aid agencies have identified budgeting procedures and financial management as major obstacles to project implementation and have found it difficult to work directly with the MOWD. They have developed a number of techniques for funding, planning and implementing projects that limit contact with the MOWD. These approaches, while they have the short term benefit of making project planning and implementation easier and more effective for donors, have in the long-term weakened MOWD.

50. Strengthening MOWD planning capability both at headquarters and at the district level would go a long way to removing bottlenecks and providing improved standards of design. Strengthening should involve the improvement of facilities and employment conditions so that qualified people can be attracted to join the MOWD. A career plan is needed so that staff will be given good future prospects which will encourage them to stay. This institutional framework is lacking and its strengthening could be supported by an ASAL fund.

#### Implementation Capacity

51. As with constraints and deficiencies in planning, MOWD is experiencing problems and bottlenecks in implementation capacity. This applies particularly to availability of plant and equipment for both surface and groundwater projects. For instance the MOWD drilling capacity for boreholes consists of 21 drilling rigs, 9 of which are rotary and the remainder percussion rigs. Ten machines are in the ASAL areas at present and three of them are broken down. This equipment has been built-up since 1974 and has generally been in the form of gifts from different donor countries which has resulted in a mixture of equipment from different manufacturers: German, Austrian, Japanese etc. Serious constraints to borehole production are as follows:

- Lack of spare parts due to shortage of foreign exchange and length of time to obtain them through complicated procedures. No spares are manufactured locally;

- Lack of fuel supplies to keep rigs going especially in remote areas. Although funds are allocated for fuel they are used for other purposes;
- Lack of transportation especially to transport heavy equipment from one site to another;
- Breakdowns and lack of support unit to effect repairs.
- Delays in supply of drilling materials;
- Government service incentives for working in remote areas are not comparable with private sector;
- Severely reduced fund allocations and lack of control of finances at district level.

52. With these constraints, the rate of drilling boreholes is slow and on average each machine is capable of drilling only one hole a month. Some of the existing equipment is becoming very old and there is an urgent need for new rigs to meet the increasing demand for more boreholes.

53. The situation in the private sector is no better than in MOWD. There are 30 registered drilling contractors of which only about seven have equipment that is operational. The largest is the Kenya Drilling Co. Ltd with 19 machines. They undertake mostly Government work because the MOWD has insufficient capacity. They in turn do not have enough equipment to meet the demand. Achievement rate of satisfying demands is about 80%. The cost of a borehole drilled by private contractor is normally about twice that of MOWD. Constraints are much the same as MOWD but commercial risks have to be controlled more carefully. However output of 1000 m per month is only 50% of capacity on account of breakdowns. Experiences of working in very remote areas have been harsh. Policy is now for activities to be restricted to within a radius of 200 km from Nairobi within which drilling operations can be given adequate support. Working outside this limit requires a special contract package. As a result, contractor work in the ASAL areas has reduced from 30% of total activities to 10% over the last five years. However, experience in the ASAL areas is good especially in Turkana, Marsabit and the North East where they have worked on several donor packages. Many donors however, bring their own rigs for the particular projects on which they are engaged. Several NGOs also have their own rigs.

54. The implementation constraints in both Government and the private sector clearly show that the demands for groundwater abstraction cannot be met. The present state of the equipment is poor and there is insufficient quantity. With the trend to develop Kenya's groundwater resources more fully there is a need to provide more drilling equipment. It is suggested that this would best be done in the direction of the private sector through the provision of finances for drilling package projects. This would encourage the private sector to become more efficient. This investment in borehole development should form part of the ASAL programme. In the same context the development of lower cost hand drilling equipment should be promoted in the same programme.

55. The situation on the dam construction units in Range Water Division of MOWD is much the same as the drilling division. Implementation capacity is lacking through inefficient output from existing plant and equipment and the need for new. Private contractors also lack equipment and expertise. The result is that: construction times are unduly long resulting in high

investment costs, schemes are abandoned unfinished on account of cost over-run due to improper construction systems and the poor quality of the works resulting in higher maintenance and operational costs. In the second Livestock Development Project (WB) 1983, it was reported that out of 36 planned water projects consisting of dams, pans, boreholes, springs, river developments and pipelines only eight had been completed.

56. The demand on the existing equipment is very high because rehabilitation through desilting is required every few years. This problem must be overcome by improved catchment management to reduce erosion and siltation and improved designs and technology. Until this trend is reversed investment in new dam construction unit for the present form of rehabilitation and construction of new pans is considered risky and uneconomical. Support for dam construction equipment is therefore not recommended at this stage.

57. Low cost water supply projects in the form of wells, rock catchments, channels etc. do not have the same implementation constraints as for the larger ones, because there is an element of self-help of beneficiaries providing labour and outside funds are only required for materials, T.A. and training. Nevertheless lack of transport, fuel and personnel at district level are serious constraints to implementation.

58. Support for these water projects should however be encouraged. The institutional and manpower problems could be overcome with an ASAL fund operating at both headquarters and district level.

#### Operation and Maintenance

59. Lack of implementation capacity through breakdowns can be attributable to insufficient and inefficient maintenance. Preventive and remedial maintenance is urgently needed. The main constraints to operation and maintenance are:

- Lack of trained capable staff and lack of knowledge in repairing equipment;
- Lack of recurrent budget;
- Hence lack of transport and lack of fuel.

60. Many projects are too sophisticated for community level operation and maintenance. Diesel pumps are a particular case in point. A solution to overcoming GOK's burden of recurrent cost is to apply appropriate low cost technology which can be handed over to the users for them to operate and maintain. This reinforces the argument in favour of simple hand pumps for shallow wells, roof and rock catchments, gravity supplies, sand dams, pans, dams, and boreholes which can be operated by animal power.

61. Lack of operation and maintenance has resulted in the deterioration and failure of many existing water supply facilities. The Government is looking to rehabilitate these systems as a priority as well as building new ones. This includes low cost appropriate technologies as well as the high technology solutions. In the Kwale rural water supply programme existing local wells are being cleaned, covered and hand pumps installed. In Kitui the USAID has been assisting the Ministry of Agriculture repair existing subsurface dams, rock catchments and protected springs. In the Kilifi resettlement scheme GTZ are assisting the Ministry of Settlement refurbish hand pumps and rehabilitate existing wells and boreholes. However, without



effective operation and maintenance, exercises in rehabilitation are a futility because projects will fail again for the same reason. As already described this has been the case in desilting pans at frequent intervals.

#### Training

62. As described above, the lack of adequately trained staff at all levels is a problem. Various assessments, including the National Water Master Plan, suggest that MOWD needs more staff in the middle and upper manpower levels. This absence of professional staff is ascribed both to difficulties in recruitment and to the non-competitive level of public salaries as compared with private sector salaries. There is also a shortage of trained personnel at the technician level. Well trained staff are needed for well drilling, the supervising of field projects and to maintain and repair equipment. Institutional support of improve MOWD planning capability should also extend to both in-house and external training. Although some training is being done (i.e. hydrogeologists by the Dutch) much more training is needed which should be supported by an ASAL programme.

### B. Issues for Future Development

#### Potential

63. The potential scope for water supplies in the ASAL areas is unlimited and the demand for water amongst its inhabitants is perhaps their greatest felt need. However water supplies must be looked at in conjunction with other activities in each particular location. To install a water point in a remote area will invite concentration of people and livestock. Often as not overgrazing and denudation will occur around the water point destroying the environment invariably beyond restoration. The greatest issue therefore for water supply in the ASAL is the provision of carefully planned water points to be in sufficient number, density and in the right locations to meet these demands while not causing environmental degradation.

#### Appropriate Technology

64. The use of large dams and relatively sophisticated technology solutions for rural water supply has been questioned. The basic issue raised is whether the country can afford piped water schemes which rely on dams, sophisticated pumps and water treatment plants. The operation and maintenance problems have been discussed. There is a growing consensus that such levels of technology in projects are inappropriate at this juncture in Kenya's development and that if 75% of a rapidly growing rural population is to be serviced by 2000 it will simply not be feasible if reliance is placed on high technology alternatives. This is particularly the case in the ASAL areas.

65. Hence the direction of low cost appropriate technology must continue to be taken. Because conditions in the ASAL are so variable no particular water supply technology can be considered appropriate for all areas. Some technologies are more suited in some areas and not in others. Conditions at each site therefore needs to be assessed and the most appropriate technology applied. The technologies which have already been described have in general been well tried and tested in locations where funding by donor agencies has been made available. There is good scope for replicability in other areas of the country and new technologies should also be tried if appropriate.

66. Open surface storage in the form of pans and dams will continue to be rehabilitated every few years on account of siltation. From the very poor performance rating they are perhaps not the best form of technology for the provision of water in ASAL's hostile climate of erratic and low rainfall, high temperatures and evaporation. On the other hand it can be said that abandoning pans through siltation does give the surrounding grazing land a chance to recover. Analysis of this issue is needed.

67. The greatest scope for increasing the availability of water supplies lies in subsurface and sand dams as there is an abundance of sites throughout ASAL areas. This technology can be readily identifiable by the beneficiary and only limited TA is needed for a simple design. Construction by self-help is relatively straightforward and closely resembles traditional methods of digging for water in sandy river beds. Typical works would include a shallow well equipped with a hand or draught power pump.

68. Rock catchments should be encouraged where suitable opportunities exist. Encouragement of rain water collection should also be made and each new corrugated iron roof should have a label attached to it advertising the benefits (in the form of a logo) of saving rain water!

69. Where perennial streams occur there is scope for further development of gravity supplies, canals and pipelines. Also consideration to hydraulic rams and turbine pumps should be given providing low maintenance can be guaranteed.

70. Analysis of the groundwater potential is continuing and any water development from boreholes will provide in general more reliable supplies than surface water. The issues of water abstraction from boreholes for full sustainable projects have not yet been resolved. Diesel pumping has its associated problems of high recurrent operation and maintenance costs and consequent breakdowns. The potential for windpower is considerable but issues of cost and maintenance for locally manufactured windmills still preclude their wide application. Solar energy is still in its infancy but the potential is promising especially with capital costs decreasing. Solar pumps so far are restricted to not being able to pump great depths.

71. The most appropriate form of water pumping in remote areas would be animal draught power and this issue must be adequately addressed. Pump technology is available (such as a mono pump and other positive displacement makes). Appropriate gearing mechanisms and animal harnesses need to be designed, tested and manufactured in Kenya for this technology to be adopted especially by the nomadic pastoralists. The constraints and issues of early experiences of draught power in Kenya must be obtained.

#### Cost Sharing and Sustainability

72. The Government has a long history of support for self-help projects. This support is reiterated in the 1984-88 developmental plan. In the rural water supply sector self-help is the most widely adopted method of cost sharing. However such self-help projects have experienced problems and cost sharing is an emotive issue. The aim in the ASAL areas is for water supply projects to be fully self-sustainable and operated by the beneficiaries with negligible recurrent costs incurred by Government.

73. Several issues still need to be addressed in order that all water projects in the ASAL are fully self-sustainable.

- Adequate and appropriate planning and design commencing with full discussion at beneficiary level to establish full extent of requirements and needs.
- Finance - the promised funds must be allocated at the right time at district level from MOWD or donor agency.
- Materials and equipment availability.
- Organization of self-help groups.
- Disillusionment if water supply inadequate after self-help effort in labour and money.
- Unwillingness of users to contribute to operation and maintenance.
- Lack of harmony between MOWD and users.

74. Experience suggests that small-scale water schemes have a better chance of becoming sustainable than larger ones. This is because beneficiaries can identify themselves with a small project as being theirs compared with many thousands being served by a large project. This is an issue which needs to be addressed at an early planning stage.

#### Implementation Equipment

75. Coupled with the implementation issues of low cost self-help water projects are the issues the country is facing with the lack of equipment to drill boreholes and construct surface water structures. Each rotary drilling rig costs Ksh 6 million (US\$375,000) and a percussion rig, Ksh 350,000 (US\$21,900) (complete with tools) landed in Kenya. The cost of hand drilling equipment is in the order of US\$2,000. Support in the private sector has been suggested particularly through development packages. This will go a long way to resolve this equipment issue.

### C. Conclusions

76. The conclusions for domestic and livestock water can be summarized as follows:

- The MOWD is endeavouring to meet the water supply demand to achieve ambitious targets by the year 2000 for everyone to have reasonable access to water supplies but the achievement to date only covers a small percentage of the population.
- Surface water projects in the form of pans and dams are prone to silting and involve extensive rehabilitation programmes every few years. These projects are not considered good investment potential.
- The potential for sub-surface water projects in the ASAL areas, especially sand dams, is good.
- There is potential for groundwater development and scope for pumping using wind power or solar energy. These resources are extensive and have not yet been fully exploited. Further

development of these resources must be encouraged for which funding is needed for research.

- Pumping using animal draught power must be given serious consideration especially in the remote pastoralist areas. This low cost appropriate technology has great potential for sustainability and much can be learnt from its use in other countries. Support is needed to encourage this development through an ASAL programme.
- Availability of investment funds from donors is at a higher level than can be absorbed by Government on account of severe bottlenecks in planning and lack of implementation capacity. In addition, budgetary constraints and financial controls at ministry and district levels limit the rate of project implementation.
- Lack of government recurrent funds, equipment and transport put serious constraints on MOWD maintenance ability. Many projects have fallen into disrepair and have been abandoned. As a result rehabilitation needs are extensive.
- Future ASAL funds should include for institutional strengthening which would go a long way to improving MOWD's absorptive capacity for investment funding and rate of implementation.
- An ASAL fund should also include a training programme in MOWD at all levels from headquarters to district and particularly at the user beneficiary level.
- There is a shortage of equipment for drilling boreholes and constructing surface water projects in both the Government and private sector. Therefore there is an acute need for support in this area especially the private sector, and it is suggested that this be included in an ASAL programme.
- The 'Mwethya' womens groups in Kitui and other self-help groups have successfully developed water projects which are sustainable with only a small amount of assistance from outside resources. Such groups should be encouraged in other ASAL districts using replicable technologies and should be included in an overall ASAL Programme.

Several technical options are open for an IFAD ASAL programme. These will be discussed in the Options chapter VI together with development in water harvesting and small-scale irrigation.

### III. WATER HARVESTING

#### A. Background

77. This chapter only deals with water harvesting for agriculture. It is an ancient technique, particularly used in the Middle East (Ref. 5 and 6) and its application under the name "water harvesting" is relatively recent in Kenya. Traditional forms of moisture conservation such as bunding on slopes using trash have nevertheless been practised in the past.

78. Water harvesting has two important functions. By the formation of earth bunds high intensity rainfall and large volumes of run-off (being characteristic of the ASAL areas) can be controlled to encourage infiltration into permeable soils. In addition run-off flow velocities are reduced so that erosion can be prevented. Hence water harvesting also becomes a very efficient soil conservation technique.

79. There are several methods of water harvesting and the applicability of some of these in some of Kenya's pastoral areas has not yet been fully tested. Apart from "fanya juu" bench terracing which is extensive in many parts of Kenya, particularly Machakos and Kitui, water harvesting has only been taken up in a few donor-assisted programmes, notably in Turkana, Baringo and Kitui. The main purpose for 'fanya juu' was for soil conservation and the water harvesting effect of improving moisture retention has been incidental. Although very popular this technique is not generally applicable in the drier areas because low levels of precipitation need to be concentrated rather than absorbed in situ. The experiences of water harvesting gained in these areas have so far revealed many constraints and potentials and it can be considered as still being in its infancy in Kenya.

#### B. Available Technology

80. All run-off harvesting systems comprise a catchment area and a cultivated area. The size of each and their relative proportions to each other can vary considerably. The broad classification of the systems can be placed under four headings - Macro catchments (or external catchment systems), Micro catchments (or within field catchments), Macro-Micro catchments (a combination of the two) and Spate irrigation. The characteristics of the systems are outlined as follows:

##### Macro Catchment (See Figure 4)

- Catchment area is a single unit normally larger than 0.5 ha and is separate from the cultivated area.
- Catchment/cultivated ratio usually greater than 2:1 and often 5:1.
- Any excess run-off spills from one structure to another within the cultivated area.

##### Micro Catchment (See Figure 5)

- Catchment and cultivated areas are fragmented and interspersed within field.
- Catchment/cultivated ratio usually less than 3:1.
- All run-off from the catchment is accommodated within the system.

##### Macro-Micro Combination (See Figure 6)

- Combination of features of both systems above.
- Informal system practices can be adopted such as use of run-off from road drains.
- Formally designed system maximising use of run-off.

##### Spate Irrigation (See Figure 7)

- Use of flood flows from streams and rivers by construction of temporary diversion weir.
- Diversion channel to cultivation area.

Within these systems there are several water harvesting techniques which have been used in Kenya to date and there are a number of possible techniques which might be appropriate and need to be tried especially on sloping areas in Zones V and VI.

#### Contour Ridging (bunding)

81. Small earth bunds up to 40 cm high are built along the contour and on average they are placed at 3 metre intervals. The bund is constructed by excavating a furrow and placing the earth on the downstream slope. The space between each bund and furrow on the next contour (3m) is the catchment area - this being a micro catchment system. Cultivation consists of planting along each side of the furrow.

82. Earth movement is between 250 and 450 m<sup>3</sup> per hectare and the method can be applied on slopes up to 3%. Soils should be deep (about 1 m) and rainfall at least 200 mm during the growing season. This technique can also be used as a macro system adopting an outside catchment area. The difference would involve the construction of a collector bund leading run-off to the cultivated area from the catchment area. Spillways would also have to be built in the contour bunds (generally every 20 m) so that run-off ponding behind bunds can overflow down to the next contour bund. To avoid the construction of spillways which require grassing and stone work the bunds can be made of fixed lengths with their ends turned up the slope. Ponding occurs behind the bund and spillage passes round the turned-up ends down to the next bund.

#### Semi Circular Bunds (See Figure 8)

83. Semi circular bunds are built with ridge tips on the contour. As a macro catchment system run-off is impounded to the level of the contour and overflows to the next row of semi circular bunds positioned on a lower contour. The distance between semi circles on the contour is generally equal to the radius of one semi circle. If considered as a micro catchment system the distance between rows depends on slope and catchment/cultivated ratio. The system can be designed as a macro-micro combination incorporating features of both individual systems. Height of bunds are normally 30 cms minimum and will increase with increasing slope. This technique is suitable for areas with slopes up to 3% and 200 mm rainfall in the growing season. Earth movement would be between 450 m<sup>3</sup> and 1500 m<sup>3</sup> for each cultivated hectare. This technique has so far been considered as suitable for improved grazing but also could be used for crops.

#### Trapezoidal Bunds (See Figure 9)

84. These are similar to the previous method but are larger. The straight section runs parallel with the contour and two containing arms which extend up the slope at 45°. These will increase in length proportionately with decrease in slope. Bund heights are 45 cms and will increase with slope. This technique again is suitable for both micro and macro and a combination of both systems.

85. Catchment/cultivated ratios will vary dependent on the amount of rainfall. This technique has mainly been used for crop cultivation but is also suitable for fodder. Depending on slope volumes of earth to be moved for bund construction will range from 800 m<sup>3</sup> to 3000 m<sup>3</sup> per cultivated hectare. For rainfall below 200 mm the catchment area will need to be larger and the bunds more substantial to hold larger volumes of water. Much more

research is needed to establish relationships between rainfall, run-off catchment areas, slope and infiltration rates.

'Negarim' Micro Catchments (See figure 10)

86. A method of water harvesting suited to tree planting alone consists of micro catchments formed in semi circular or V shaped banded structures. The uphill tips are on the contour and the holes for tree planting are sited at the lowest point within the bund. The catchment area should be designed to ensure that the tree is supplied with adequate water during the most sensitive periods of growth. The catchments are generally small (5 m x 5 m has been used in Turkana).

Spate Irrigation

87. Essentially the technique involves diversion of flood flows from a stream or river onto gently sloping land, which has been contour banded slightly down the slope. The aim is to spread the water slowly over as wide an area as possible to encourage maximum infiltration and moisture retention but at the same time to prevent scour and subsequent erosion. The bunds are normally built to provide a zig zag arrangement. Flow is ponded behind bunds and overflows around the ends of the bunds (which are turned up the slope as for contour ridging) down to the next contour. The diversion structure should not necessarily be permanent but be built of the cheap materials available i.e. brushwood and soil from the stream bank. If it is breached because floods are too high it can be easily rebuilt with hand tools. The costs involved would be technology and training input as required to provide setting out details and instruction on operation. All construction work can be undertaken by self-help labour.

Terracing (see Figure 4)

88. Bench terracing has the distinct function of reducing natural land slopes which has the beneficial effect of retarding run-off, increasing infiltration and moisture retention and also retaining erodable soils for which it was originally designed. Bench terracing which is considered as a micro catchment system can be developed from several techniques.

- 'Fanya-Juu' ridges - in which a channel is dug along the contour and soil is thrown on the upper side of the channel. Grass is then planted to stabilise the soil.
- Unploughed grass strips along the contour.
- Trash lines laid along the terrace line.
- Stone terrace - small stones laid along the terrace line.

89. 'Fanya juu' and stone terrace methods are widely applied in zones II-IV. However the scope in ASAL districts is limited to some parts of Zone V only. This is because the terraces are laid on the contour at 1 m vertical intervals which allows benching to develop in 4-5 years. This gives a catchment/cultivation ratio of 1:1, which defeats the water harvesting principle. Nevertheless 'fanya juu' has been popular and the adoption rate high which provides a good case for adopting the principle of terracing in water harvesting. Consideration could be given to bund construction at 2 m vertical intervals which would provide a catchment area and some terracing. The advantages would be a reduction in the amount of excavation and labour requirements and the possibilities of water harvesting on slopes steeper than 3%.

90. Grass strips or trash lines along the contour tend to be unreliable, especially on steep slopes when infiltration into the soil is not very efficient. Trash lines are readily eaten by termites.

### C. Existing Developments

#### The Need for Water Harvesting

91. In the low potential areas of ASAL the nomadic way of life is concentrated on livestock. Some traditional rainfed sorghum is grown. With increasing population pressures through migration and rise in birth rate true pastoralism is becoming less sustainable. Recent droughts have caused many livestock to perish. Nomads have become destitute and have had to survive on food aid. As a consequence water harvesting techniques have been reactivated over the last five years in the Turkana area and Baringo as a means of maximising the limited rainfall resources to increase food production to a beneficiary acceptable level rather than continuing to rely on food aid. Any technology which can increase food security in ASAL areas will likely be attractive to Government and donors.

#### Water Harvesting in Turkana

92. The Lodwar Flood Irrigation Scheme was constructed on an experimental basis in 1952. Flood waters were diverted from the Turkwell but this scheme was abandoned three years later through water control problems and the Turkwell shifting its course. The Nakutan Scheme built a year earlier was also abandoned for the same reasons.

93. The Impala Experimental Scheme at Lorengippe was designed and implemented in 1963. It included a gabion weir which diverted part of the flow in a channel to a series of basins. Good results were achieved in the first few seasons and it was shown that Turkana sorghum and white cowpeas were well adapted to water spreading techniques. Failure of the scheme was due partly to the weir silting up because of lack of maintenance of the diversion structure resulting in the river changing its course. Also maintenance became intermittent on account of cattle raids in the area and many people moved away. Several other water spreading schemes were developed about the same time but soon collapsed through complete disinterest. The approach was 'top down' and there was no involvement of the local beneficiaries.

94. Increasingly at that time attention shifted to small-scale irrigation schemes which were developed along the Turkwell river (Amolem, Kaputir, Katilu and Turkwell). In 1979 a US Volunteer of the Salvation Army in Lokitaung took an interest in water harvesting. The area now has seven operational schemes that have had limited success growing sorghum. The main significance of this work has been its contribution towards the acceptance of water harvesting playing a role in the Turkana economy.

95. In the last five years there has been a revival of interest in water harvesting following the Salvation Army projects at Lokitaung and also large numbers of Turkana on food-for-work and the disillusionment with the viability of the small irrigation schemes along the Turkwell river. Oxfam is continuing the Lokitaung project with some success. The Turkana Rehabilitation Project (TRP) saw water harvesting as a labour-intensive



Project (EPAP) by Catholic Diocese of Nakuru. (c) Kenya Freedom from Hunger/German Agric. Action.

99. As distinct from Turkana, Baringo is in an area of three different zones, high, medium and low of which the latter covers over 50% of the area. Rainfall varies between 400-750 mm. It is erratic and the distribution very variable. Evapotranspiration of 2500 mm per annum is four times annual rainfall in the lower zones. All have attempted to encourage dry land farmers and pastoralists to take up water harvesting methods to increase crop and fodder production. Methods have included level flooded terraces, contour ridging and both semi circular and trapezoidal bunds. Many trial plots have been set up to measure rainfall and run-off, improvement of crop yields of existing and new varieties and improvement of water harvesting techniques.

100. Baringo has been termed an "overgrazing end point" on account of gross overstocking resulting in destruction of grass cover and soil erosion. The introduction of water harvesting in an attempt to stem this denudation has only been in the last five years. Compared with Turkana, there has not been the massive injection of food aid although food-for-work has had the same effects as in Turkana, resulting in unwillingness to continue without this catalyst. Demonstration has been directed on improved yields by adoption of water harvesting and there has been a much larger effort on extension. In comparison with Turkana both the Il Chamus and Tugen have a tradition in water use for agriculture through irrigation and water harvesting and a higher degree of sedentarisation.

101. Evidence from BPSAAs trial plots suggests that yields improve substantially by using water harvesting - sorghum yields are 2.3-3.4 cowpea yields are 3.5 to 7.7 times greater. However there is criticism that the trial plots are not representative of conventional plots which has probably been one of the causes for low adoption rates. As with Turkana it is doubtful in a good rainfall year that yields in water harvesting plots will be much better than on conventional plots and therefore can the increased labour input be justified? However there is scope for increasing land area by water harvesting methods as discussed above for Turkana.

102. A major constraint to the adoption of water harvesting in Baringo is the increased labour required to prepare plot bunds. For example, in comparison with conventional tillage requiring about 200 hours/ha per annum, water harvesting bunds or ridges would require 360 hours per hectare in the first year and 200 hours in subsequent years. External catchment systems would require 600 hours and 320 hours per annum respectively. At present, farmers are not convinced that the marginal returns to labour are increased using such systems.

103. If water harvesting adoption rates are to be improved then building on the traditional water use experience of the Pokot/Tugen/Il Chamus tribes would be a wise direction to follow.

#### Terracing in Baringo

104. In addition to water harvesting activities, the BPSAAP has been engaged on extensive terracing works consisting mainly of 'Fanya juu' on soils with slopes over 5% and contour stone terraces on stoney soils. The project's soil conservation teams mark out the contour systems for the farmer, using simple line-level methods. The farmer is then expected to undertake the work voluntarily with advice from the project. By September 1984 a total of almost 1.5 million metres of terracing had been laid out on 3,900 farms and almost 14 kms of cut-off drains built. Completion rates,

which range from 25% to 100 % (average 67%), depend very much on the level of interest of individual farmers and the effectiveness of local leaders.

105. There is no clear indication yet of the benefits of stone terraces and yield results have been somewhat confusing. This system, however, has involved a large number of farmers in the active conservation of their soil. This has had an important training and extension benefit. The extent to which a farmer is willing to maintain these structures will depend on security of tenure and the desire to use the plot for an extended period of time rather than follow traditional shifting cultivation practices.

#### Water Harvesting in Kitui

106. As early as 1937 the problems of land degradation were being addressed in Kitui although only recently has the importance of this problem been revived. Several organisations are involved with soil and water conservation programmes at present and they include both Government and NGO. The most important, established in the early 80s, is the GOK/USAID ASAL Project (Ref. 11). This programme includes water harvesting for crops and fodder as well as domestic and livestock water supply. 1/ Water developments using run-off techniques based on "Mwethya" group participation have generally been both cheap and popular, but less so in the case of water harvesting for agricultural development. During the last two years the Project has included water harvesting trials using contour ridging, conducted in a similar way to those in Baringo, but crop yields have been disappointing because rainfall has been above average while run-off harvesting is most effective in dry years.

107. Critchley (Ref. 11) states that "there is no doubt that the effectiveness of run-off harvesting is still to be proved conclusively". In spite of low yields, the response to the trials has been favourable and farmers have expressed satisfaction with the methods. A major constraint, however, is the labour input required to build bunds and ridges.

#### Cost Estimates

108. Water harvesting structures in Kenya have been built almost entirely using hand labour on a food-for-work (FFW) basis. The cost of moving earth has therefore been related to the equivalent food paid out per day and the market value of the food. Data derived from Finkel, Critchley and Hogg show the following:

- A trapezoidal bund with a volume of 380 m<sup>3</sup> would require 860 kg of maize and 15 litres of cooking oil;
- The labour output per day measured in Turkana was approximately 1 m<sup>3</sup> and in Baringo 1 to 1.5 m<sup>3</sup>.
- Equivalent earthwork unit costs are Ksh 7.8/m<sup>3</sup> (US\$0.44/m<sup>3</sup>) plus 20% for supervision, 20% for transport and 10% contingency. Overall unit earthwork costs are Ksh. 11.7/- (US\$0.73) per m<sup>3</sup>.

This rate is generally confirmed by Hogg who estimated in 1984 and 1985 costs, using FFW, as Ksh 7.3/m<sup>3</sup> (US\$0.46/m<sup>3</sup>) for maize and oil inputs alone.

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1/ Discussed above in Chapter III

109. Costs estimates, prepared on the basis of an unit earthwork rate of Ksh. 11.7/m<sup>3</sup> are given in Table 4. For trapezoidal bunds range, depending on the slope, from 9300/- to 34,750/- per hectare (US\$585-2,172) compared with semi circular bunds which range from 5,270/- to 17,670/- per hectare (US\$329-1,104). Contour ridging is generally cheaper at 2,930/- to 5,270/- per ha (US\$183-329) because less earthworks are involved. Fanya juu costs approx. 4,900/- per ha (US\$306). Spate irrigation costs range from 10,000/- to 20,000/- per ha (US\$625-1,250) and micro catchment for trees are estimated to cost 15,200/- per ha (US\$950).

#### D. Constraints and Potentials to implementation of Water Harvesting Systems

##### Applicability

110. Areas suitable for all types of water harvesting would need to fulfil the following criteria.

- Agro-climatic zones V to VII.
- Topographical slopes not more than 3%.
- Soils must preferably be deep (at least 1 m) and permeable and free of salinity and alkalinity problems. These would include alluvial clays and silty sandy loams.

111. There is scope for water harvesting throughout the ASAL areas, providing these broad based criteria are fulfilled. Conditions for each site will, however, vary and designs will need to be site specific. Both Finkel and Powell (Ref. 7 & 8) have suggested that there are many potential areas for water harvesting in Turkana notably at Kakuma. Some nine areas have been identified as having the greatest potential. In area they amount to 72,000 ha and the annual rainfall ranges from 350 mm-500 mm.

##### Acceptability to Beneficiaries

112. Micro catchment systems are generally less costly than macro systems because structures are smaller. They are a more efficient and a more intensive form of land use utilising run-off from lower rainfall thresholds. In contrast to this is the farmer's dislike of not cultivating the whole of the cultivated area in a micro catchment system. Land tenure is a constraint in pastoralist areas particularly where all land is trust land.

113. The issue of land tenure needs to be resolved in areas where there is sedentarisation so that ownership can be established to improve chances of adoption. Water harvesting in pastoralist areas may only need general agreement on areas to be cropped.

##### Labour Constraints

114. Labour availability has been shown to be a major problem, although labour input requirements could be reduced through:

- Modification of design techniques and trials that will accommodate the use of oxen to construct bunds with suitable implements developed in Kenya. Prototypes are being designed and tested at the present time.

- Reduction in the amount of earthworks by decreasing the volume of bunding per hectare using a modified system of "fanya juu" with vertical intervals greater than 1 m.
- The use of machinery (tractors and ridgers) to construct bunding for all water harvesting systems. Earth bunds would need to be substantial to reduce the need for maintenance. But guarantees of acceptability and adoption by farmers would be needed to justify investment costs. Maintenance would be done by farmers to avoid the return of machinery with associated burden of recurrent costs. Provision of hand tools should be considered to provide an incentive.
- Machinery costs in the form of wheeled or crawler tractors or graders would be in the order of 800/- to 1200/- (US\$30-75) per hour giving an approximate cost of 20/- (US\$1.25) per m<sup>3</sup>.

#### Control of Livestock

115. It has been reported that some of the earlier water harvesting schemes worked well but a major constraint was the lack of control of livestock surrounding a scheme. Fencing was not successful and only through education and training will pastoralist farmers see the advantages of water harvesting as an activity which can be undertaken with livestock.

#### Planning Capability

116. At present, water harvesting techniques have been developed through the many aid programmes in the districts described above (Table 1) and have not been integrated with MOA activities. Indeed there is no district authority within the Ministry of Agriculture (MOA) responsible for this sector. The Soil and Water Conservation Branch (SWCB) in the Agricultural Engineering Division of the MOA has had "moisture conservation" attached to its scope of functions but none of its activities contain water harvesting experience. In the same division the Irrigation and Drainage Branch (IDB) has recently prepared a field workers manual on "Water Harvesting and Water Spreading in Turkana" (Ref. 12) but, again, has no direct experience in water harvesting or is only undertaking minimal activities in this field. A GOK policy directive is required to give SWCB a mandate to extend its activities to include water harvesting. Only then can a strategy be developed to provide planning capability for this relatively new technology.

#### Training in Water Harvesting

117. Training in water harvesting techniques is essential if it is to succeed. Some training at farmer level has been undertaken during water harvesting programmes, in Turkana, Baringo and Kitui. Some people have been involved in a course in Israel and some local courses have been undertaken to train Turkana in water harvesting techniques and management. However, no formal training programme exists in the MOA. Training should be provided at all levels from head office to district level and particularly at beneficiary level. Trials and demonstrations would also need to be undertaken in parallel with training. Funding for training should be included in an ASAL programme.

118. The water harvesting technologies so far used in Kenya may not be entirely appropriate in spite of modification. Consideration should be given to the possible use of technologies which are being used successfully in other parts of the world such as flow through systems developed in Australia.

#### E. Issues

119. There is need for a clear policy to promote sustainability of structures and to encourage cost sharing. This policy should take into account food for work which is provided from time to time for water harvesting and fanya juu terracing. Whilst food for work may be necessary in certain areas, it should not be allowed to undermine self-help programmes which have been important in encouraging the spread of fanya juu terracing on private lands. It should not be regarded by recipients as a necessity for the construction of water harvesting schemes, although it should be recognized that incentives may be desirable especially at the outset of a water harvesting programme.

120. Incentives to construction on private lands or for cropping purposes in communal areas may include limited mechanical assistance (to ease labour constraints) and the provision of tools. Food-for-work should be confined to resource conservation/infrastructure works on public land for the benefit of the whole community.

121. In the MOA the agricultural machinery services unit does not have adequate capacity due to breakdowns through poor maintenance and lack of spares and insufficient recurrent budget for operation. If machinery is to be used for the implementation of water harvesting works implementation, it is recommended that private contractors be used to undertake the work. An alternative would be to provide support to the MOA agricultural machinery services.

#### F. Conclusions

122. Improved food production in the ASAL areas can be achieved by water harvesting techniques. However, the introduction of water harvesting works in Turkana, Baringo and Kitui has only occurred in the last five years and there is an urgent need to appraise the performance and sustainability of such schemes. Particular attention must be paid to the following:

- Greater dialogue is needed with farmers and pastoralists to understand their aims and desires and attitudes towards water harvesting. Greater understanding is needed of traditional water harvesting methods undertaken by the Il Chamus, Pokot and Tugen tribes in Baringo.
- Modification of engineering technology to keep systems as simple and as durable as possible. Other appropriate technologies from overseas should also be considered.
- The need to convince farmers that water harvesting can provide a crop where normal rainfall conditions will not, and that crop and fodder yields can be increased to provide sustainability of production.

- Government should support water harvesting by increasing the responsibilities of the Soil and Water Conservation Branch in the Ministry of Agriculture.
- Training and extension are urgently needed. Demonstration by trials of these techniques has so far not persuaded farmers to adopt water harvesting. Principles used for "fanya juu" which has been very successful should be followed.
- The need for replacement of food-for-work with a well planned development programme.
- Water harvesting should be started in other ASAL areas.
- The important issue of labour input must be resolved at an early stage. Solutions for using draught animals and machinery must be investigated. Provision of hand tools should also be considered.
- Increased water harvesting development could best be undertaken through an ASAL fund giving support to Government to build-up an institutional framework at district and headquarters level and provide the necessary training at all levels especially the beneficiaries.

#### IV. SMALL-SCALE IRRIGATION PROJECTS

##### A. Background -- Irrigation Development in Kenya

123. Kenya has no irrigation tradition of any significance, apart from some traditional surface irrigation on the lower slopes of Kilimanjaro, the shores along Lake Victoria and the Kerio Valley in the Baringo area. The total area under irrigation is 26,000 ha, mostly in the private sector, with 8,500 ha in the public sector and 1,500 ha devoted to smallholder schemes. On account of the very high cost of public sector schemes (Bura \$25,400 per hectare) and problems of insecurity of tenure and high water charges, there is now general disillusionment in this sector. Future prospects for this type of irrigation development appear bleak.

124. Several small-scale irrigation systems have been built in the ASAL areas since the late 60s by Government, donor agencies and NGOs. They were designed to provide an alternative livelihood to pastoralists who were destitute following severe drought and political insecurity in which livestock losses were nearly total. Their experience, which is described below, has been disappointing. GOK has now embarked on an irrigation policy of small-scale, low cost and farmer-managed schemes.

## B. Ongoing Irrigation Development

### Existing Schemes

125. Table 5 details 1/ current small-scale irrigation schemes in the ASAL areas. Brief descriptions of several of the schemes are discussed below and from these case studies general constraints and issues have been identified.

126. Garissa Cluster. The Garissa Irrigation Development Programme (GIDP, NE. Province) involves a number of schemes around Garissa and other villages on the east bank of the Tana River. These were started by NGOs in the early 70s to help destitute Somali pastoralists to grow their own food. These schemes have been discussed previously (Refs. 13-17) and the main reasons why these schemes have not become self-sustainable, are as follows:

- Random selection of farmers and no group spirit;
- Language barriers because few Somalis speak Swahili;
- Irrigation technology too complicated and operation and maintenance costs for pumping too high;
- Lack of consideration of traditional livestock raising in conjunction with irrigated crop production.

These schemes are being rehabilitated by Danida on a three year programme.

127. Ewaso Ngiro Cluster in Isiolo Eastern Province consists of three small schemes Malka Dakaa, Garfassa and Merti which were initiated in the early 70s under an agreement with UNDP/FAO for the purpose of settling destitute Boran pastoralists. These schemes were also part of the broader national strategy of development in the ASAL areas and have already been discussed in several reports. (Refs. 13,18,19 and 25). Problems preventing self-sustainability have been:

- Unreliable flows in the Ewaso Ngiro river, heavy silt loads and increased salinity through insufficient irrigation;
- Pumping has been an expensive recurrent cost and the provision of fuel supplies to this remote area has been a continual problem.
- Conversion to gravity by hand-dug canals on food-for-work basis has demoralised farmers at Malka Dakaa and because the scheme is managed by IDB, farmers have no sense of belonging. In contrast, some farmers have independently initiated similar works in the same area;
- Crop yields at Garfassa are reasonable but 0.10 ha plots do not provide sufficient food for subsistence. However a triple economy is functioning with food-for-work for maintenance and livestock.

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1/ The list is not complete but demonstrates the extent of small-scale irrigation development in the ASAL areas.

128. There are several other small indigenous schemes on the outskirts of the Lorian Swamp which have been developed with little or no support from outside.

129. Ishiara scheme on the Embu/Meru boundary was built in 1950 as a small pilot farm under the aegis of ALDEV. As the scheme exists today it has 44 tenant farmers on 0.8 ha plots which are not their own. The main lessons (Pof. 19) are as follows:

- The adoption rate is extremely low because farmers have dry land farming activities.
- Being tenant farmers they do not feel that the plots belong to them.

130. Turkana Irrigation Cluster. 1/ In the Turkana/West Pokot Districts in Rift Valley Province. Three schemes - the Turkwell, Katilu and Amolem were started in the 60s and 70s by UNDP/FAO. When this agreement expired in 1982 a new TA agreement was made with FAO as well as NORAD agreeing to assist financially and technically for four years. There are several other small-scale irrigation schemes in the area which have been developed through NGOs and food-for-work programmes. They, like Isiolo and Graissa, were established to grow irrigated crops and provide alternative means of subsistence to destitute pastoralist families who were receiving famine relief. In 1983, the South Turkana Agricultural Extension and Support Unit (STAESU) was created for the continuation of the Turkana Cluster with the aim of making the schemes become self-sustained operations. General experiences have been as follows:

- Turkana are individualists so that there is little cohesion and cooperation between them.
- Schemes were designed with inappropriate concepts and modern technology with high level of operation and management costs. This resulted in poor performance because the Turkana did not have the knowledge.
- Performance has improved by conversion to simpler irrigation technology;
- Silting at intakes is a continual maintenance problem.
- The use of self-help task groups, many of them women, for milling, marketing, etc. has had encouraging results.
- Off-scheme cropping and livestock must be given more attention by increased level of extension.
- Cooperative societies have not been successful.
- Water users associations have become an important vehicle for operation and maintenance and is making the phasing-out of superimposed management easier. At Lokui and Morulein, high levels of self management and self reliance exist.

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1/ Refs. 13, 16, 17, 19, 21, 22, 23 and 24.



- At Kaputir, full participation of farmers existed from the beginning. They had some experience of irrigation and the scheme was developed entirely by hand labour. As a result they regard the scheme as theirs. This is an achievement considering the high individualistic nature of the Turkana and most of them were former nomadic pastoralists.

-Until the Turkwell river has been controlled by a new dam no new schemes should be built.

131. Lower Tana Village Irrigation Programme (LTVIP in Coast Province). Between 1977 and 1981 the NCCK developed several small village schemes along the lower reaches of the lower Tana. The LTVIP which was launched in 1980 by the IDB has built on the NCCK work and envisages some 15 to 20 schemes covering an area of some 1,000 ha. The programme has been financed by the World Bank and the Netherlands. The programme concept envisages that each farmer will cultivate an irrigated plot of about 0.5 ha and the rest of his income will be generated from other off-farm activities. The schemes will have the flexibility to encourage the people gradually towards increased irrigated agriculture - a step-by-step approach.

132. Mnazini was the first scheme (38 ha) implemented within the framework of LTVIP and it produced its first crop in 1982 entirely undertaken by hand, although the village asked for tractors. This was not achieved on account of poor experience of tractors on other small schemes. This programme has been reported under Refs. 13,16,17 and 23). Problems have been as follows:

- Because pumping was technically necessary the farmer had to have cash income as well as subsistence. Hence he was allocated two plots, one acre for rice and half an acre for bananas and vegetables for cash.
- Although farmers made positive contributions to the scheme from their labour and formed a water users association, operation costs for pumping amounted to half the value of their paddy crop.
- Hence pumping is a major constraint to scheme viability.
- Associated with pumping are fuel supply and spare part problems, handling large sums of money, the need for cash crops and hence markets in remote areas.

133. Eldume (Ref. 13) is located in Baringo District Rift Valley Province and the traditional farming system is based on livestock. Some indigenous form of shifting irrigation however, has been practised for generations where run-of-river supplies are possible. Family fields of 0.5 ha are in the form of micro basins and crops grown are maize, beans and finger millet. Attempts to divert water from the Molo river failed through technical problems. Hence 159 farmers formed a self-help group and applied for assistance from the PIU who agreed to support a 100 ha scheme for 250 families. Several points emerge:

- Each farmer provided free labour and the most important motivation was to produce food and avoid having to sell livestock to purchase food.

- Low initial construction costs of 6000/- (US\$380) per ha. was financed by the Netherlands and KFFHC on a food-for-work basis.
- Operation and maintenance costs of canals and bunds are very low and undertaken by the farmers themselves.
- Grazing of livestock around the scheme forms an integral part of the farmer's economy.

It is expected that there will be an accelerated growth in the number of livestock surrounding the scheme with associated overgrazing problems. This calls for far reaching policies to be developed to provide a framework for balanced development of cropping and livestock systems on schemes such as this.

#### Constraints and Potentials for Small-Scale Irrigation

134. From the description of the schemes above, several general major constraints clearly emerge which need to be taken into account when considering any future development of sustainable small-scale irrigation in the ASAL areas. These are as follows:

##### Technical Constraints

135. Climatic and topographical features are major technical constraints to schemes, notably unreliable water supplies and unstable offtakes from rivers. The rivers in the ASAL areas are prone to floods, meandering channels and active river regimes with high silt loads. Desilting inlets is a problem on many of the schemes which is not only costly in human and financial terms but is also demoralising to the farmers. Several schemes have been abandoned as a result and it is questionable whether some should have been implemented in the first place through inadequate data and poor designs.

136. The need for pumping is a severe constraint due to the high annual costs for fuel and spares. Farmers have to grow cash crops in addition to subsistence crops to meet such costs and invariably this upsets their fragile economic viability.

##### Managerial Constraints

137. Schemes involving heavy investments which involve continuous support from Government have little chance of immediate success in the ASAL areas. The Kibirigwe gravity sprinkler scheme, for instance, west of Embu falls into this category. However the Mitunguu gravity sprinkler scheme near Meru, which has only been operational for a year, does show signs of being successful. Farmers own their own plots, have a strong farmers' association which, it is hoped, will take over management and operation in the near future.

##### Sociological Constraints

138. From the experiences gained to date of small-scale irrigation schemes in the ASAL areas, it is evident that irrigation alone has not been able to provide sufficient food on which a farmer and his family can subsist. Generally this is because plot sizes 0.5 ha or less are not sufficient to provide subsistence for their families, but the constraint is that a farm family cannot cultivate larger areas by hand. Hence it is necessary for a farmer to have other income in the form of dry land cropping

and or livestock. Mechanisation would defeat the objectives for low cost sustainable schemes. As the settlers are mostly pastoralists, livestock continues to play a vital role in their way of life. As described previously, a framework is needed whereby a farmer can have an irrigation plot as well as attending to his herd of livestock. The problems of overgrazing around irrigation schemes require careful planning. Rainfed agriculture must also be taken into account so that a triple economy can be developed with all activities in harmony with one another. With other off-farm activities adoption rates on the scheme will likely be low in its early life. Thus slow rates of development should be planned with a step-by-step approach which will give farmers a chance to learn and given them the opportunity gradually to grow accustomed to irrigation. Great flexibility is therefore needed in the design approach for small-scale irrigation development, and the aspirations of the target group farmers need very careful consideration.

#### Planning Capability and Training

139. Small-scale irrigation is undertaken by the Irrigation and Drainage Branch (IDB) of the Land Development Division (LDD) of the Ministry of Agriculture (MOA). The IDB was formed in 1980 through merger of the Small-Scale Irrigation Development Project. (SSIDP financed by the Netherlands) and the Arid Region Irrigation Development Programme (ARID) sponsored by UNDP/FAO.

140. The IDB has established Provincial Irrigation Units (PIUs) in all provinces. Their role concerns the development of irrigation and drainage for small farmers on either private or communal land. In contrast the National Irrigation Board (NIB) in the MOA deals with the large-scale settlement schemes or state-owned land. The IDB/PIUs work entirely through the District Focus Policy. Schemes are generally conceived by farmers themselves who express their needs and hold discussion at sub-locational level. The IDB aims at providing the appropriate technology through its own staff to meet the farmers needs and put forward a proposal to the District Level Committee for inclusion in the GOK budget if successful. Hence there is need for IDB staff at district, divisional and scheme level who should, like the farmers, participate in planning, execution and guidance of activities.

141. Although the IDB, since its inception has been run by Netherlands expatriate staff, the situation is now changing as more Kenyans take over and expatriates withdraw. In spite of good progress made there is still a lack of qualified personnel at all levels. Senior staff recruited locally have agricultural degrees with only a single year post-graduate course in irrigation and drainage. Technical Officers (TO) and Technical Assistances (TA) have only training in agricultural engineering which means there is an absence of professionally qualified irrigation and hydraulic engineers. This situation is being ameliorated by in-house training undertaken by Netherland expatriates. The IDB also have a Kenyan Training and Extension Officer who organizes workshops and training courses for all staff. Some 20 TOs are being trained per year and training is occurring at all levels from IDB head office (TOs) to the District level (TOs and TAs) and on down to the farmers at same level. The approximate overall IDB and PIU staffing levels as they are at present and the demands for future development as well are given below.

recommended in their low cost development approach that average investment costs for future small schemes range between 10,000/- up to 40,000/- per hectare. However, each scheme must be considered and costed on its own set of conditions.

#### Choice of Technology

146. For future development of small-scale irrigation to be sustainable to the beneficiary farmer it has been shown that simple low cost technology is an essential prerequisite. Gravity supplies should generally take preference over pumping, although initial capital costs of the former could be higher. For gravity schemes, inlet structures from silt laden rivers need to be carefully designed. The technology to prevent silt ingress into schemes is available and must be used to the best effect. The methods of irrigation must also be carefully considered to match farmers understanding. Simple methods should prevail even at the expense of reduced water efficiency. All watercourses should be adequately designed for permanency and minimum maintenance.

#### Farmer Participation

147. Successful irrigation schemes with good adoption rates have undoubtedly been those which have involved full farmer participation from inception through planning, construction to ultimate operation and management. Committees, working groups and water users associations are essential mediums and catalysts to encourage activity in schemes. Womens groups and committees are also of vital importance to scheme viability. Scheme development should be at a pace the farmers can cope with which calls for a step-by-step approach. The objective in farmer participation is to create a sense that the scheme is theirs. Being given something for nothing is really not a recipe for success. Dependent upon means, farmers should contribute towards implementation, generally in the form of self-help labour, with the provision of hand tools as an added incentive. In some cases, their labour could be paid for by food-for-work. These issues need to be adequately addressed for schemes to achieve full sustainability in the future. In this context, it is important that farmers have secure land tenure and are not considered as tenants.

148. Whilst increased farmer participation in scheme management and cost sharing is to be encouraged, most existing donor-initiated schemes are too complex and their operating and maintenance costs are too high to make this solution practical. Some of these schemes could be taken over by the farmers if management were simplified and operating costs reduced, by converting from pump to gravity fed intakes, furrow to basin irrigation, cash crops to traditional subsistence crops and adjusting plot size downward to what farm families can manage.

#### Cost Sharing

149. Small-scale irrigation development is mostly funded by capital grants from donor agencies through Government and NGOs. The donor and GOK commitment to small-scale schemes up to 1989/90 is set out in Table 6 which summarizes forward budget costs for rehabilitation, operation and maintenance as well as some new development. This finance is not redeemable and the beneficiary farmers are not expected to make annual repayments. For schemes to be self-sustainable however without Government having to carry the burden of operation and maintenance costs, it is desirable that these annual costs must be borne by the farmers themselves. However at Eldume and Garissa, annual pumping costs are too high to be borne by the farmers themselves.

#### Absorptive Capacity

150. The total donor investment in the four year period amounts to 3.28 million Kenya Shillings (US\$205,100) and the GOK contribution 0.669 million Kenya shillings (US\$41,825). With a potential of 17,400 hectares (above) at an investment cost of 310 million Kenya shillings (US\$19.4 m) there is a large scope for additional investment opportunities which could be supported by an ASAL fund. However the absorption capacity of IDB has already been shown to be lacking due to insufficient staff. Hence an ASAL fund must include provisions for the improvement of planning and implementation rate in conjunction with improvement of the overall infrastructure at headquarters, provincial and district levels. Coupled with staff build-up is the need for training at all levels in appropriate low cost technology.

#### D. Conclusions

151. Small-scale irrigation has limited potential as a solution for ASAL development for the following reasons:

- 1) The ability of irrigation development to provide a new and decent living to destitute nomads as an alternative to the degrading life in food relief camps seems to be greatly overestimated;
- 2) Good irrigation sites, with regard to water availability and reliability, water quality, topography and suitable soils, are relatively scarce in the arid and semi-arid zones of Kenya;
- 3) Irrigated crop production, especially in remote areas with poor communications far from central services and facilities, is very risky, as the sole source of family income. Plots of 1/2 ha or less which a family is capable of managing does not provide subsistence. Other sources of income must be found.
- 4) Paying exclusive attention to irrigation development in ASAL areas is to ignore the natural 'vocation' in those areas for extensive animal husbandry. Moreover, introduction of irrigation without due attention - to the people's traditional main subsistence system of livestock keeping, and without considering the alternative of improving and expanding traditional cropping systems such as flood-dependent cropping, is to ignore the most important development resource: indigenous knowledge and skills;
- 5) In areas where there is no traditional experience in irrigation a step-by-step approach should be considered to encourage irrigation development slowly in relation to other farming/pastoralist activities.

152. Nonetheless, there is scope for limited investment to support rehabilitation of indigenous traditional schemes and to increase the self-sustainability of other existing small-scale schemes by converting them to simpler, cheaper technologies and enhancing farmers' capacity to manage them on their own.

V. OPTIONS FOR WATER DEVELOPMENT

153. In each ASAL district the natural resources vary widely and so do its people with their different traditions. Against these numerous variations a procedure for ranking the alternative technologies for water projects has been attempted by preparation of a matrix as shown at Table 7. This inventory is generalised to give an indication of where priorities are. It must be reiterated that while technologies can be replicated in many areas, each water scheme is site-specific and must take into account local conditions.

A. Domestic and Livestock Water Development - Analysis of Options for Future Investment

154. Sand Dams (including subsurface dams) have been ranked highest with the following advantages:

- Serves both domestic supplies and livestock;
- Planning and design is simple and straight forward;
- Implementation capacity requirement from line ministry is low and much of the work can be done by self-help. There is a high element of cost sharing;
- Technology is simpler and understandable;
- Adoption rate is high because people can identify it as 'theirs' and hence sustainability is good;
- Beneficiaries can easily pay low maintenance charges by raising an annual water rate;
- Capital costs per person/livestock unit are low;
- The potential for abstracting water from sand river beds is widespread over the ASAL area, especially in the low potential zones.

155. It has already been explained that the manpower and infrastructure resources are lacking for which support could be given by an ASAL fund. However the attractiveness of this option shows that the demand for these resources from MOWD are kept to a minimum. This means that implementation could be undertaken more quickly than for other options which would require a greater build-up in planning capability and implementation capacity.

156. The main disadvantage for implementation is access to potential sites which could be extremely remote. Once built this would no longer be a disadvantage especially if beneficiaries are nomadic pastoralists who do not need road access.

- Wells. have been ranked second with the same advantages as above, but yields tend to be limited to domestic use and large numbers of livestock could not be served.
- Rock Catchments have all the attributes of Options 1 and 2 but distribution is restricted to topographical rock outcrop features, which are not widespread in ASAL.
- Springs have the advantages of the above options but the distribution is confined to zone V. In that zone the potential would appear to be good.
- Boreholes. In spite of the existing high maintenance cost of diesel pumping, wind power and solar energy to some extent are being used. But the potential for using animal power with appropriate technology to reduce operation and maintenance costs has good opportunities. This option requires planning capability and implementation capacity (in the form of drilling equipment) both of which are lacking in MOWD and the private sector. Support from an ASAL fund to MOWD or the private sector is required if the demand for groundwater supplies are to be met.
- Gravity and Hydraulic Rams and Turbine Pumps. Potential in zone V is very good where perennial rivers have stable channels and steep slopes. These options have little scope in zones VI and VII where rivers are silt laden, less stable and have very flat gradients. Compared with options 1 to 4 more planning and implementation capacity is required from MOWD although much of the work can be done by self-help labour.

157. Pans and dams have not been ranked due to their many disadvantages - notably the high failure rate through siltation, pollution and damage by beneficiaries. In addition, dam construction units in MOWD are in a poor state of repair through lack of maintenance and spare parts. Under these conditions, investment opportunities are not considered high and this option is given a low ranking.

158. Rain Water Catchments have not been ranked on account of high capital costs.

159. Roof tanks. Self sustainability has been achieved in many high potential areas and in the semi-arid areas where many families have changed to galvanised iron roofs. This technology is well covered in the commercial field, and does not require ASAL programme support.

#### B. Water Development for Agriculture - Analysis of Options

160. Water harvesting has been selected as the best option for the following reasons:

161. Potential sites for water harvesting are more widespread than for irrigation;

- Chance cropping is widely practiced by pastoralists;

- Support for chance cropping is highly suitable for the target group because of its wide diffusion among the poor;
- Low investment cost/ha relative to irrigation.
- Low operation/maintenance costs (mainly self-help labour).
- Potentially high self-sustainability.
- Minimal line ministry technical/managerial support required.
- Urgent need for donor support (no programme exists at present).

Disadvantages of water harvesting include:

- Acceptability to beneficiaries not yet known.
- Impact on yields not yet proven:
- Labour constraints for initial construction.

162. This would appear to call for a programme of widespread demonstration, to familiarise local people with water harvesting techniques and gather feedback on their acceptability and constraints for adopting them. A controlled programme of demonstration could also provide needed feedback on yields obtained under a wide variety of local conditions. Beneficiary feedback could lead to useful modifications.

163. If the issue of labour bottlenecks to construct bunds cannot be resolved in some geographic areas, machinery construction should be considered. This could be undertaken by the Agricultural Machinery Unit of MOA or private enterprise.

164. Small-scale irrigation is selected as the second best option, for the following reasons:

- Potential sites are limited in comparison with water harvesting (and most of the additional sites have high risks).
- Additional area suitable for irrigation could accommodate only 1% of ASAL population.
- Ownership of irrigated land is highly skewed in some communities; development would benefit the wealthy.
- Investment cost/ha is higher than for water harvesting (except for rehabilitation of some indigenous traditional systems).
- Although impact on yields is potentially higher than for water harvesting if no technical problems occur, in actual experience, technical problems have been frequent.
- Because of their greater complexity in comparison with water harvesting, irrigation schemes place greater demands on line ministry design and backstopping capacity.
- Self-sustainability of indigenous traditional schemes is high, but prospects for making some of the more complex and costly small-scale schemes sustainable are poor.



- The need for additional donor support is less urgent than for water harvesting; and
- Additional absorptive capacity is limited.

165. Spate Irrigation. As with rain water harvesting experience in Kenya has been limited and unsuccessful. Similar advantages and disadvantages apply. Given the appropriate technology for design of temporary weirs across flood (spate) rivers there is a potential for spate irrigation in many of the ASAL districts in addition to Turkana. This technology is more in line with small-scale irrigation than perhaps rain water harvesting and again must be looked at in the same context as small-scale irrigation. Where a river is active with high silt loads a temporary spate weir might be more appropriate and certainly cheaper than a more permanent structure for small-scale irrigation.

166. Micro Irrigation has been included in the inventory because it is considered to have a potential. The definition of micro is for one or two hectares to be supplied from domestic and livestock water points especially if water abstraction can be undertaken by animal power. Tree crops and vegetables would be most suitable for micro irrigation projects. Capital costs for a small system of furrows or basins would be very low.

167. Micro Catchments. Experience so far has been confined to Turkana and West Pokot for the purpose of growing trees. This technology is not entirely suitable for crops or fodder and it therefore has a low ranking.

168. Terracing has not been ranked on account of its limitation in ASAL. It is particularly successful in zone IV and there are limited possibilities for its use in parts of zone V. Modifications to designs incorporating a water harvesting element could have scope especially on slopes greater than 3%.

## VI . CONCLUSIONS AND TENTATIVE RECOMMENDATIONS

### Conclusions

169. The greatest need of all target groups is for water for both domestic and livestock purposes and agriculture. The main constraints which are preventing steady development to meet these needs are:

- Insufficient planning capability at all levels and insufficient inclusion of beneficiaries at all stages of planning.
- Reduction of capital budgets to undertake development projects.
- Lack of implementation capacity of line ministries.
- Long duration of implementation which increases budget deficits further.
- Lack of infrastructure especially vehicles at district and headquarters levels.

- Lack of recurrent budget for operation and maintenance causing lack of fuel and spares.
- Consequent lack of maintenance resulting in breakdowns, which limits implementation and operational capacity.

170. By working either completely or partially outside the government framework, donor agencies have overcome many of these obstacles and have been able to fulfil development programmes with varying degrees of success. Few projects have, however, reached self-sustainability and many projects have failed. This has led the Government to concentrate on the rehabilitation of abandoned and failed projects before embarking on new ones. However, the issue of rehabilitated projects falling back into a state of disrepair has not been adequately addressed. Training of beneficiaries will go some way to solving these problems.

171. The general conclusions of existing experiences with water development in ASAL areas are:

- Coordination of Donor as well as NGO's activities is essential.
- Experiences of past and present activities need to be pooled and documented, so that one district can benefit from another.
- Need to build on experiences gained - the failures, successes and ongoing trials.
- Funding needed for research into appropriate technology including trials and demonstrations, and training of Kenyan staff at all levels down to beneficiaries.
- Replicability of technology from one district to another needs to be ascertained.
- Monitoring and evaluation of activities is essential to provide base data and criteria for further development.
- Access to technologies which are being successfully applied in other parts of the world is desirable.

172. For projects to be self-sustainable the dependence on mechanical power must be reduced especially diesel pumping. The resources of wind power, solar energy and use of draught animals need further exploitation. The scope for water development in the ASAL areas has good potential. However it must be looked at in conjunction with other activities and must form an integral part of the beneficiaries' traditional way of life. The constraints and issues to be overcome to guarantee successful schemes are numerous, as experience so far has demonstrated.

#### Recommendations

173. Domestic and Livestock Water - The direction for further investment should be focused towards sand dams with a cost approximating to 340/- (US\$21) per person. The nature of a package for such an investment can be considered as follows:

- Training of MOWD staff in technology;
- Request from beneficiaries;
- Identification, data collection, planning and design by district staff in MOWD and approval by DDC;
- Implementation which would include self-help labour from the beneficiaries and the supply of materials, hand tools and supervision by MOWD personnel;
- Training of beneficiaries to operate and maintain;
- MOWD staff visits to scheme during first year to ensure operational procedures are being followed and solving any maintenance problems;
- Appropriate transportation for ministry and district staff would need to be provided to enable planning and implementation operations to be undertaken.

174. The other options are wells, rock catchments, springs and gravity supplies for which investment packages can be prepared in the same way. The technologies would however be restricted to those districts where conditions are suitable.

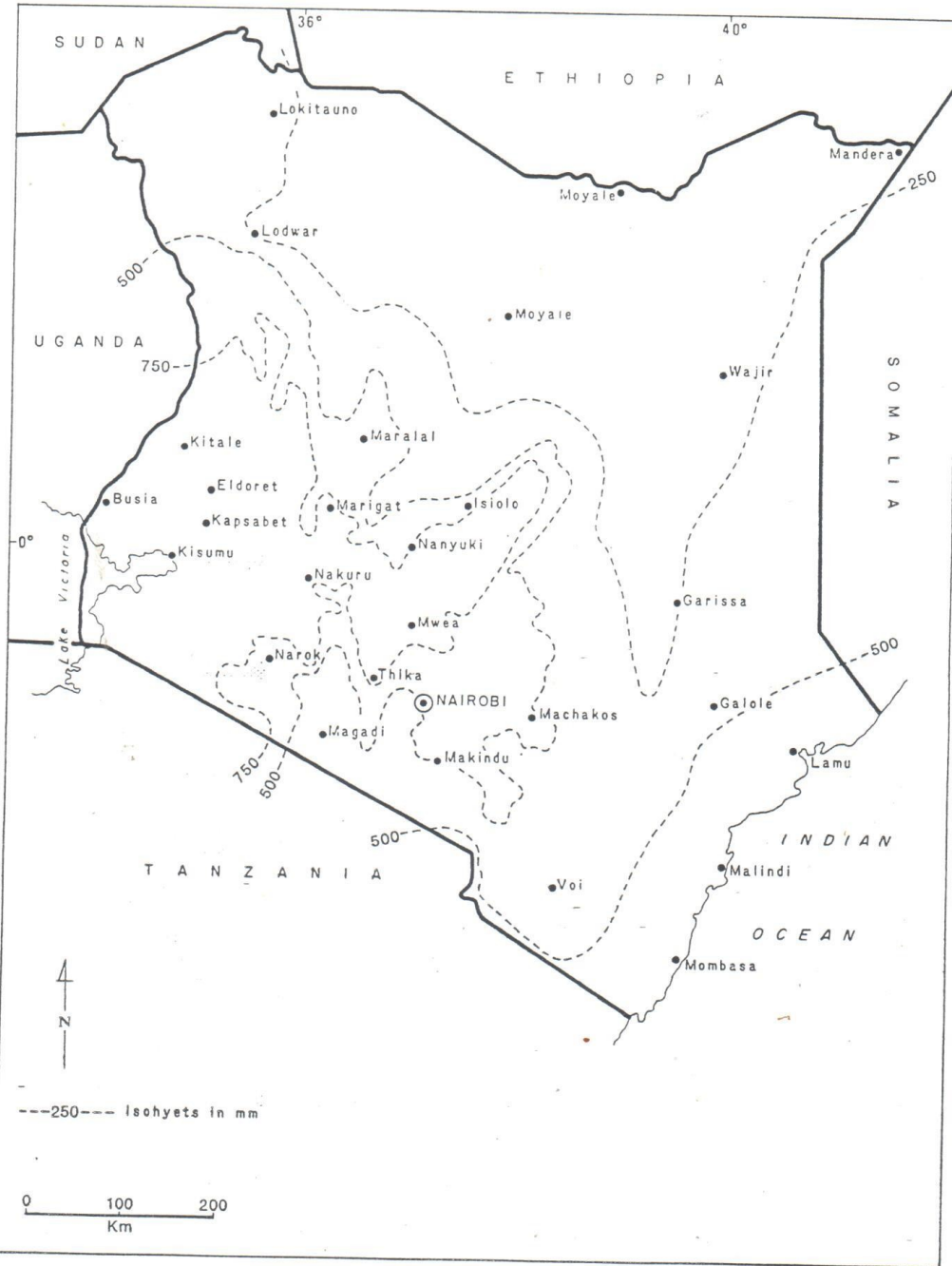
175. Water development for agriculture - The option of rain water harvesting (costing approx. 13,000/- (US\$813) per ha on 1%-2% slope should have first priority, complemented by support for small-scale irrigation with a cost of approximately 6,000/- (US\$375) per hectare where conditions are suitable. For irrigation low cost technology incorporating simple river inlet structures, gravity canals and basin irrigation using self-help labour is essential.

176. To install small-scale irrigation or water harvesting schemes, the planning and implementation procedures would be similar to those for sand dams. The IDB would be controlling body for small-scale irrigation and the SWCB for water harvesting.

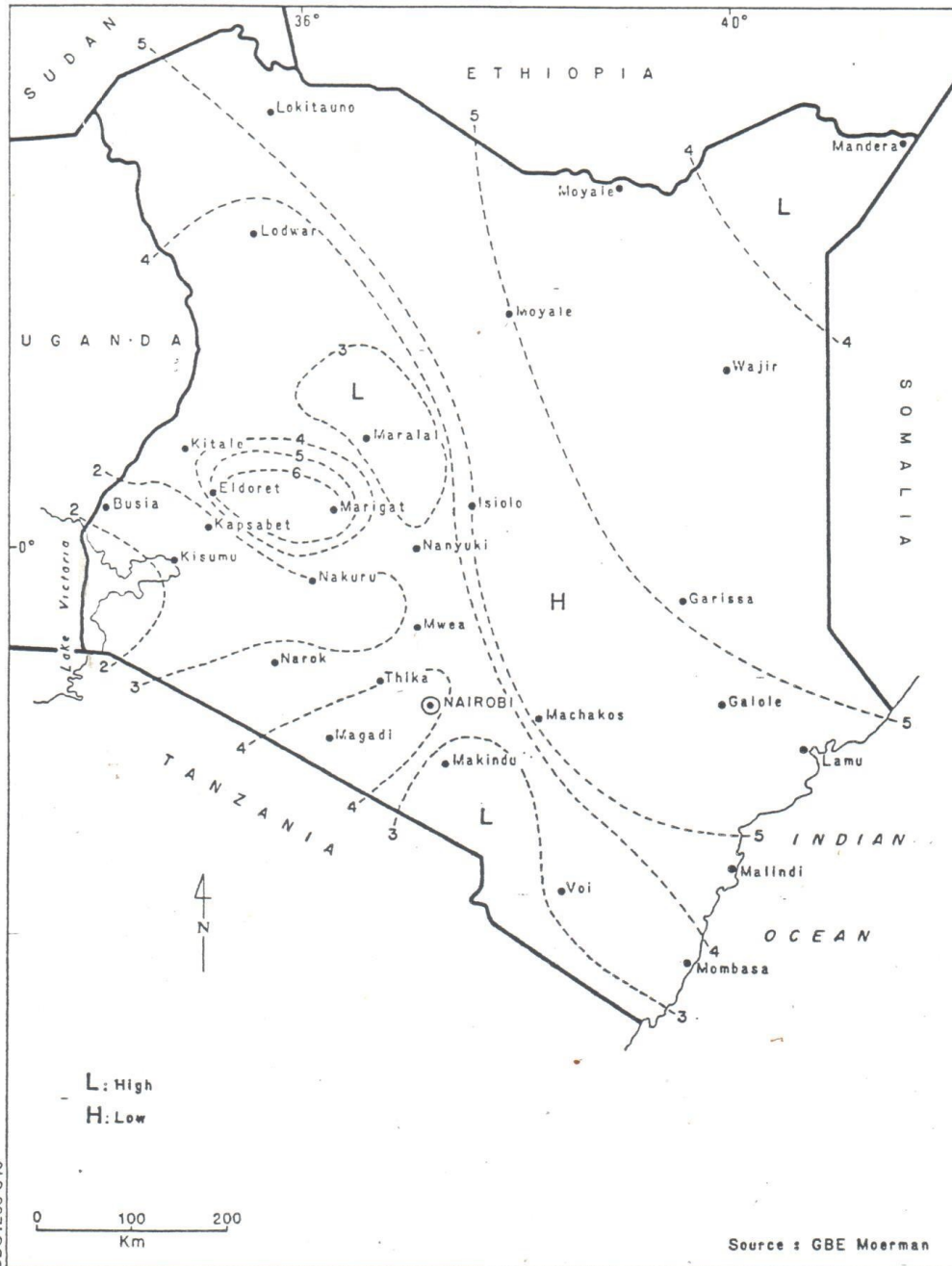
177. Where possible all water development should be closely integrated. Water for irrigation will nearly always be made available for domestic and livestock purpose as well and the relevant structures and facilities provided. Domestic and livestock water supplies on the other hand are generally confined by yield but any surpluses should be made available for micro irrigation purposes to grow fruit and vegetables.

KENYA  
ARID AND SEMI-ARID LAND DEVELOPMENT

RAINFALL MAP

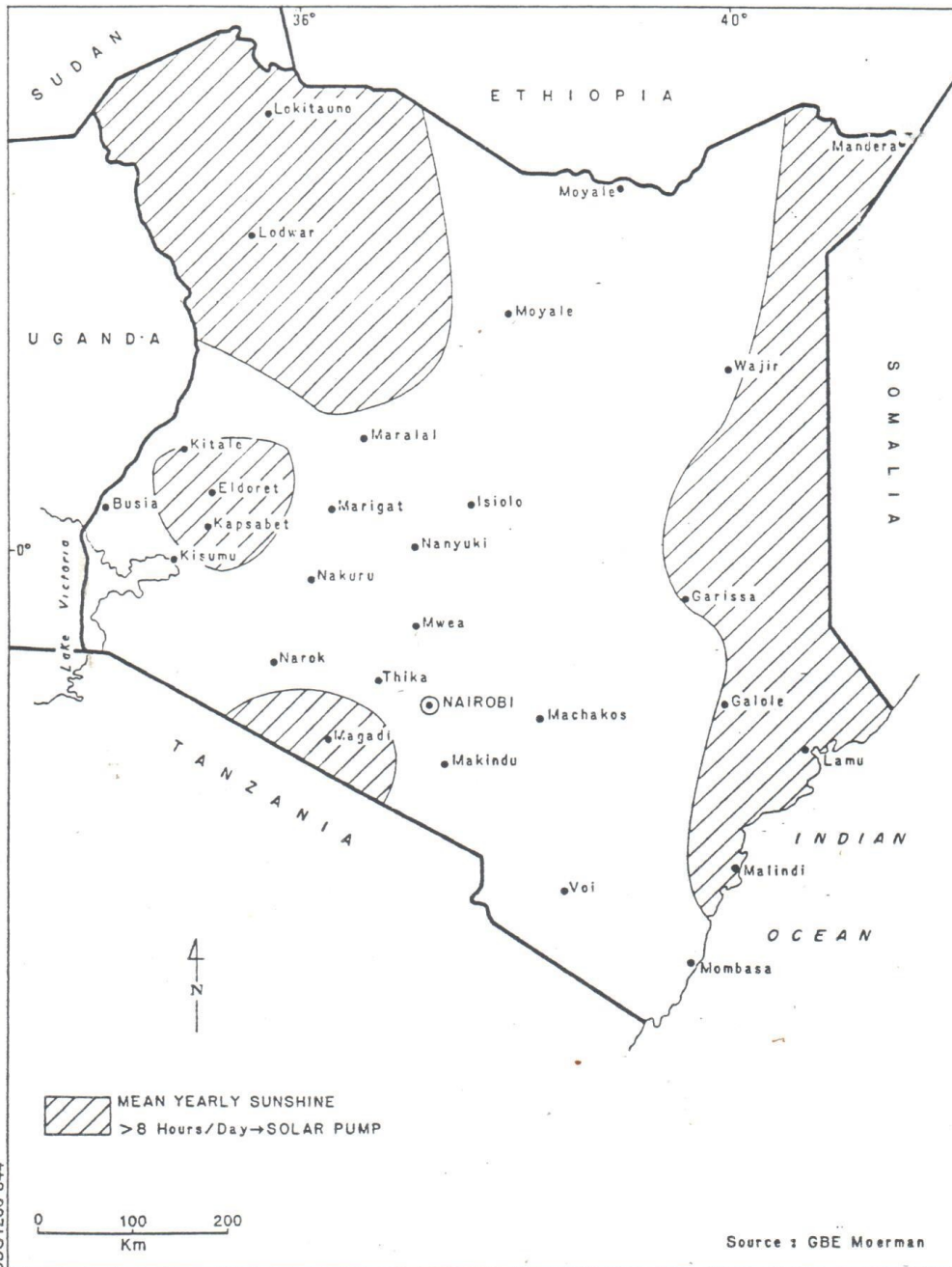


KENYA  
ARID AND SEMI-ARID LAND DEVELOPMENT  
ANNUAL WIND SPEED IN METRES PER SECOND



DDC1286-845

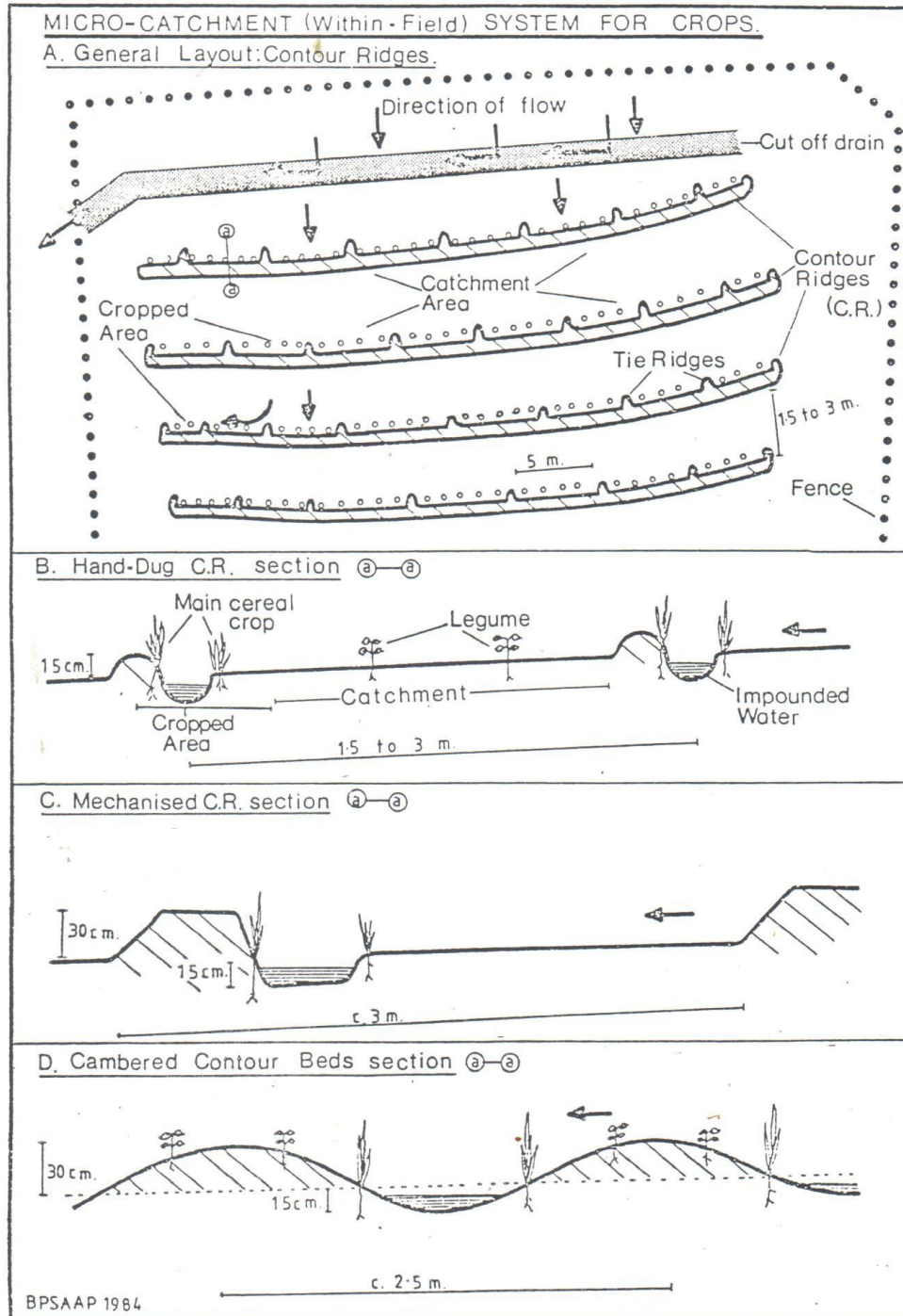
K E N Y A  
ARID AND SEMI-ARID LAND DEVELOPMENT  
SOLAR ENERGY POTENTIAL



DDC1286-844

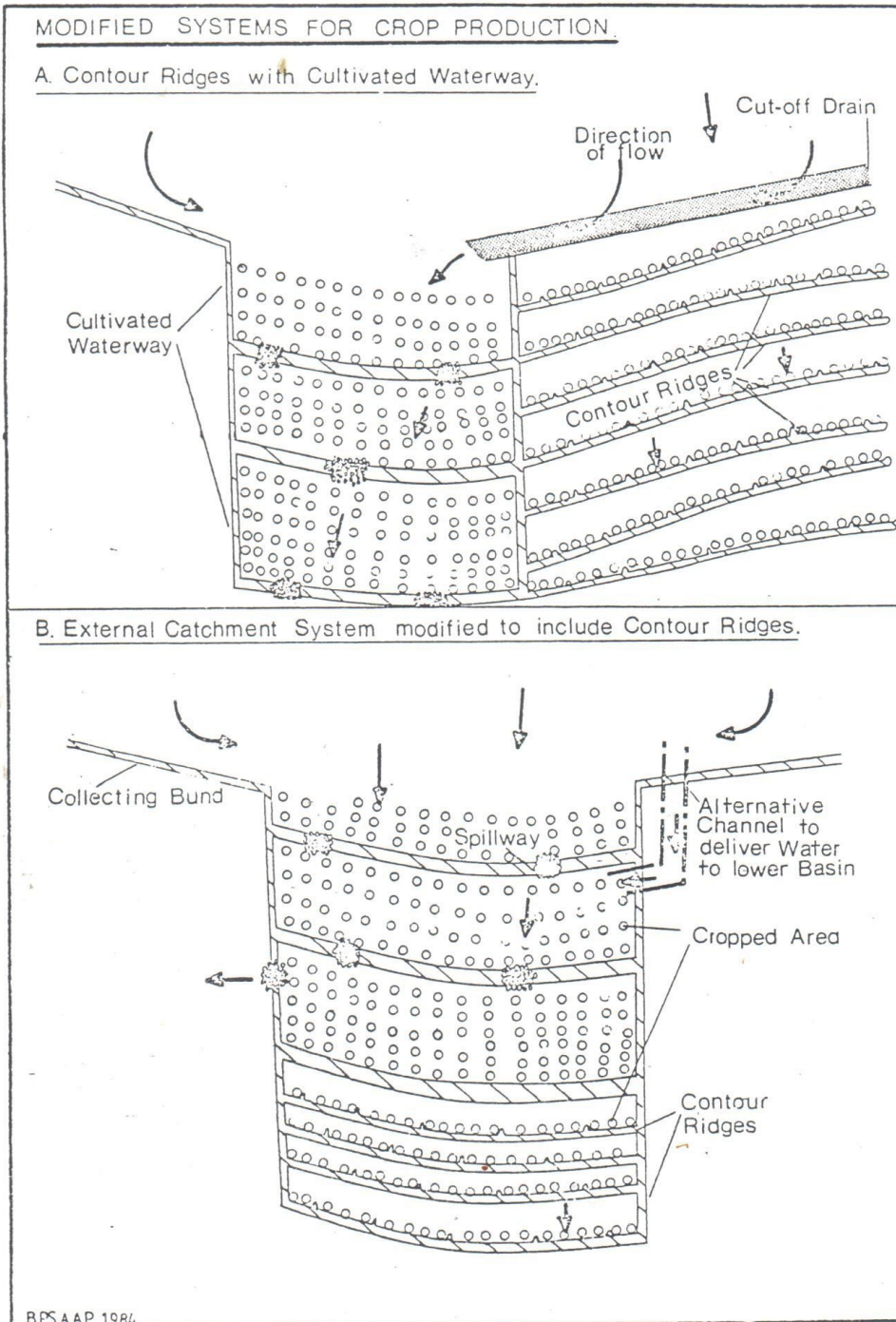
Source : GBE Moerman

# Runoff Harvesting.



# Runoff Harvesting.

ANNEX 7  
Figure 6

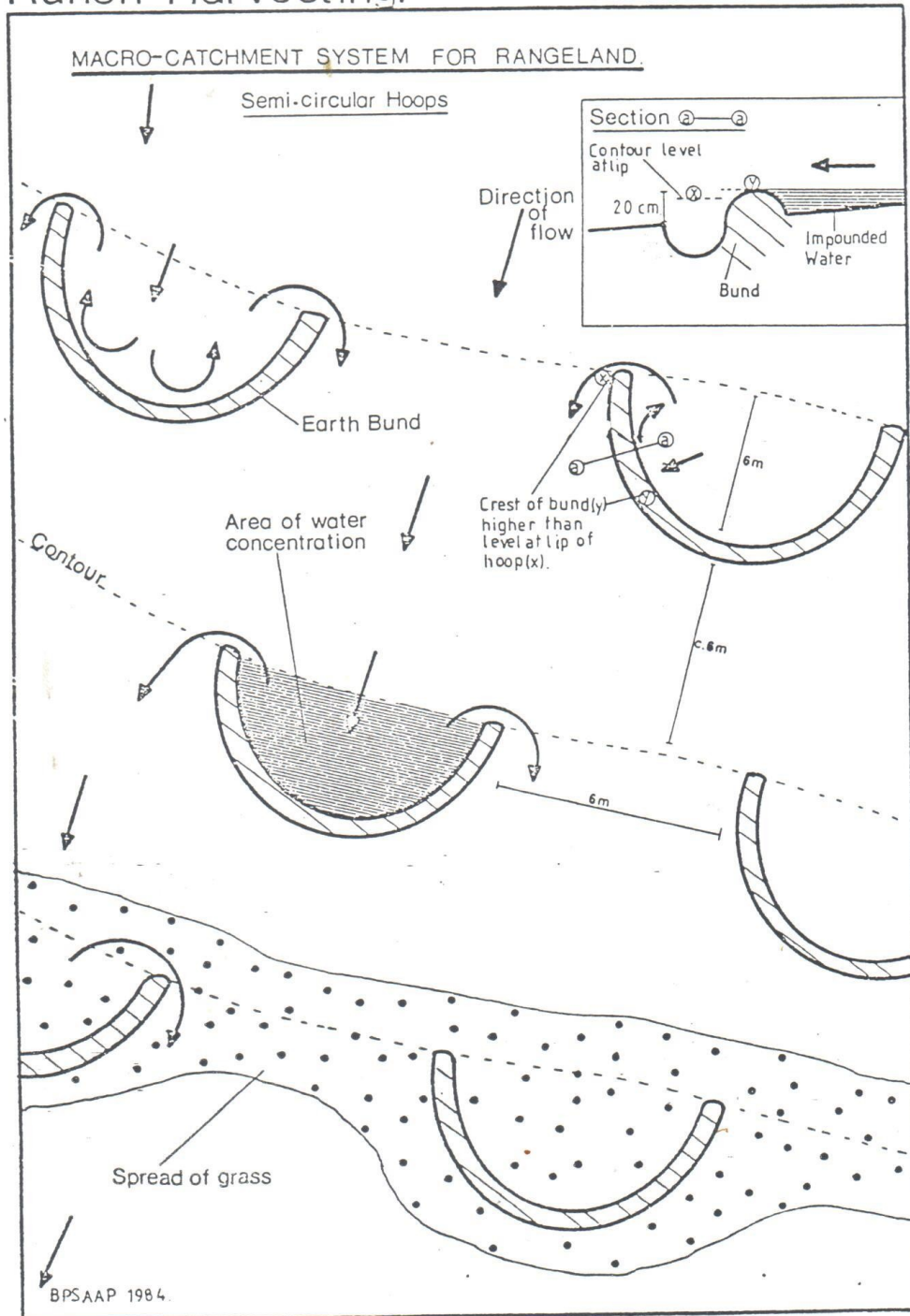


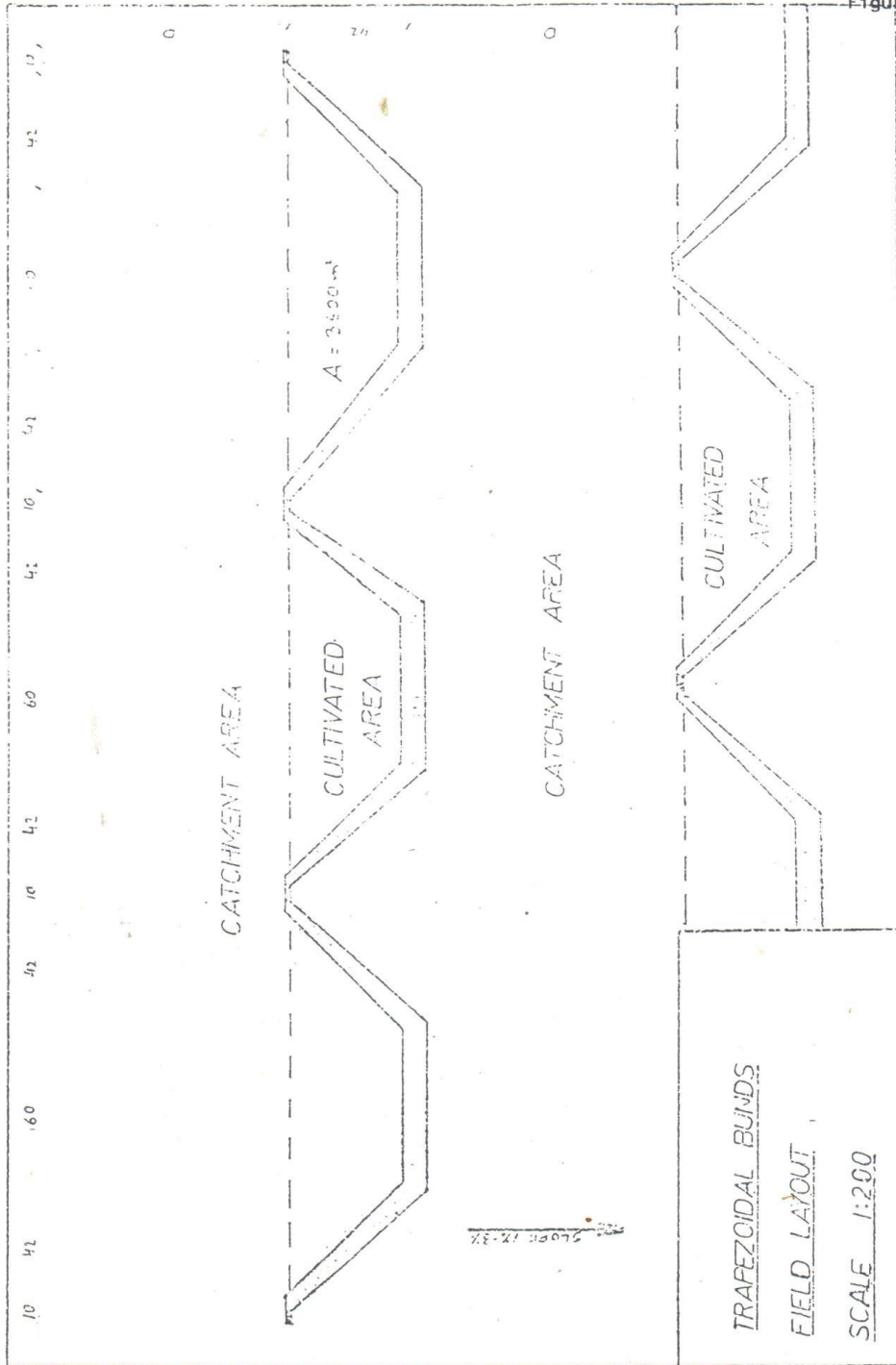




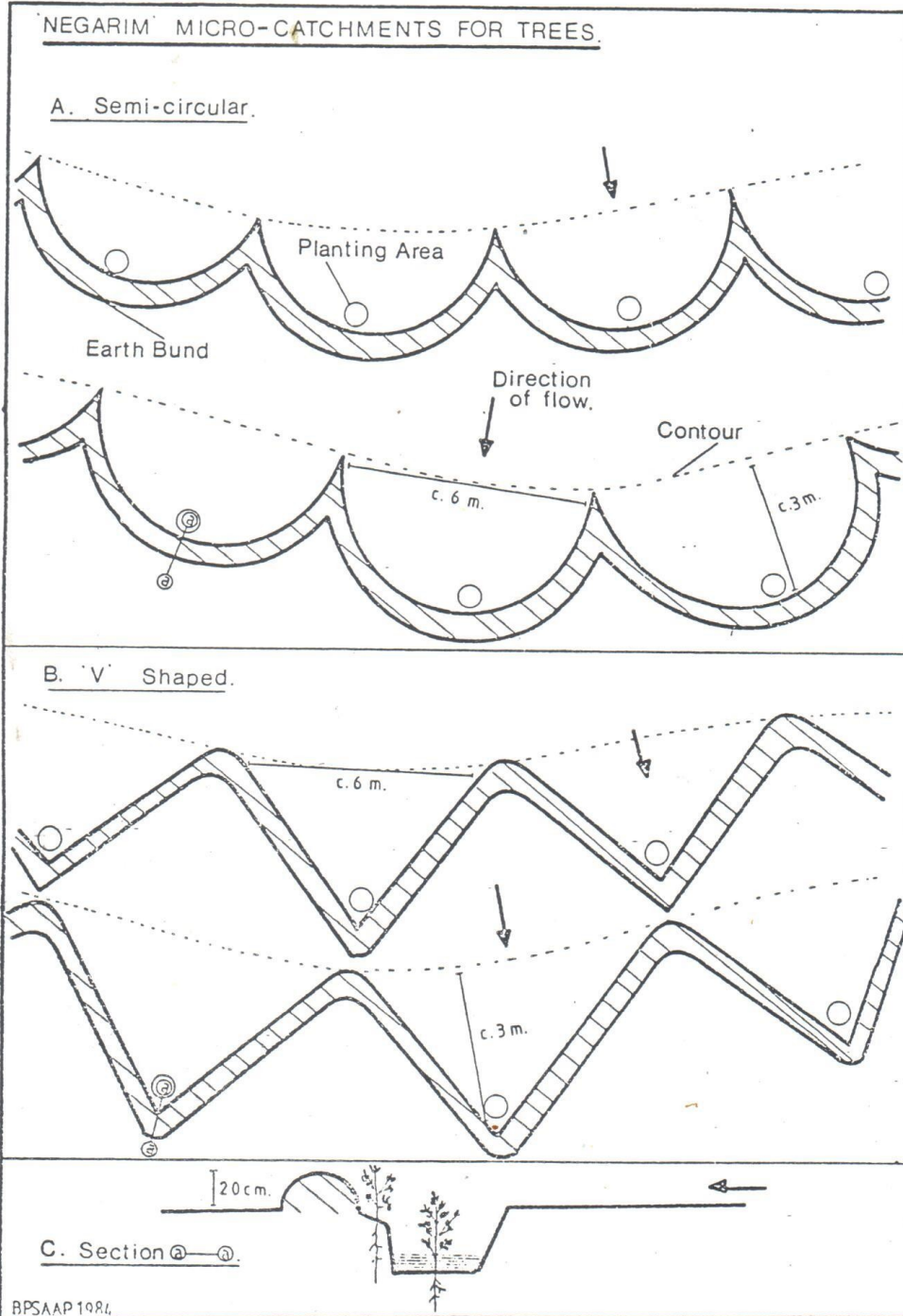
*Flood diversion and water spreading for pasture and browse production. To and fro off-contour spreading bunds.*

# Runoff Harvesting.

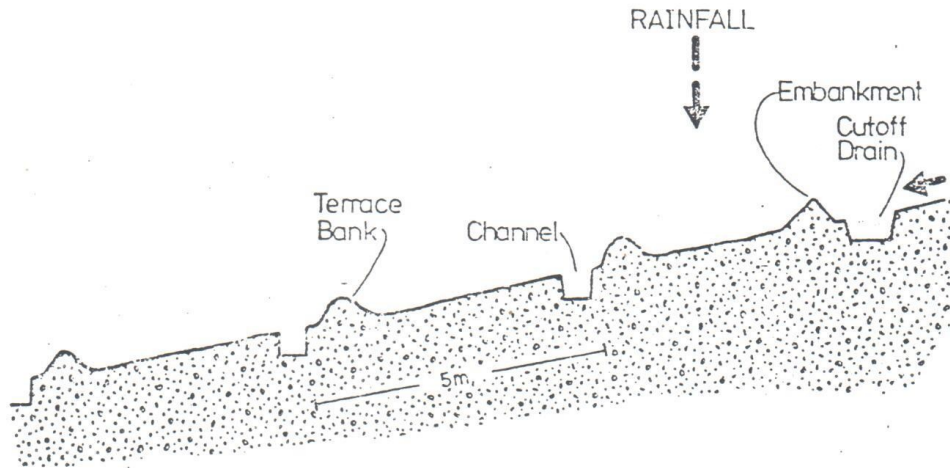




# Runoff Harvesting.

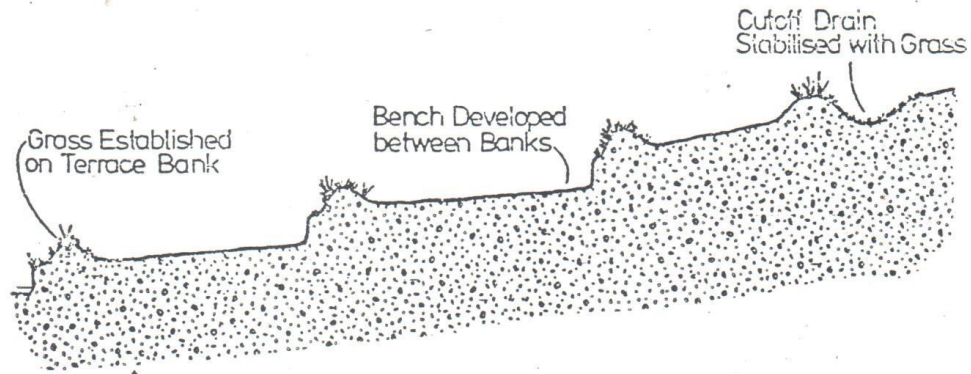


INITIAL STRUCTURES



Example Slope 20%

AFTER FORMATION OF BENCHES



LAND SLOPE : 5% to 50%	CONSTRUCTION : By Hand
RIDGE/EUND HEIGHT : 50cm	CATCHMENT:CROPPED AREA RATIO : N.A.
HORIZONTAL INTERVAL : N.A.	ZONE : AEZ4
VERTICAL INTERVAL : Constant 1m	USE : Crops

KENYA  
ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Donor	District Province	Programme	Y. Yrs	Activities	Funding	
					85/86	Total
					US\$*10 <sup>6</sup>	US\$*10 <sup>6</sup>
Norad	Turkana	Rural Water	1982-87	through RDF & EEC Micro-Project	1.29	60.0 Nkr.
Sida	W. Pokot Isiolo Kajiado	Rural Water Supplies	1982-85	Wells, boreholes etc.	withdrawn	0.55
Danida	Taita/Taveta		1986-88	Spring protection	New project	1.63
Netherlands	Countrywide	Water resources assessment studies	Stage I 1981-83 Stage II 1984-86 Stage III 1987-90	Groundwater potential		
Sida, UNDP, World Bank	South Coast	Kwale Rural Water Supply Project		Field testing, wells & tech- nological develop- ment of hand pumps		
ODA	Embu Meru Isiolo	EMI (ASAL) Project	Stage I 1982-86 Stage II 1986-89	Sand dams, gravity canal supplies roof catchment	0.87	4.66
USAID	Kitui	Kitui ASAL Project	Stage I 1979-84 Stage II 1984-87	Wells, Pans, Dams, Rock catchments, sand dams, roof catchments, springs	1.76	11.00
World Bank	Baringo	Baringo ASAL Project	1979-87	Wells, Sub-surface dams, pans	1.18	6.5
Danida	Kitui	Mutoino Soil & Water Project	---- 1987	Rock catchments,  dams, wells, sub- surface dams and springs		
Swida	Lakkipia	Lakkipia ASAL Prog.	1985-86		0.29	0.48 Renewable 2 yrs
African Med. Res. Found. (AMREF)		Kibwezi water project		Shallow wells		
Netherlands	Elgeyo, Merakwet	Elgeyo Merakwet ASAL Programme	Stage I 1982-85 Stage II 1985-88	Boreholes, Springs	0.04	Renewable 2 yrs
	Kiambu	Ndelya Karai ASAL Programme	1985-88		0.21	
	West Pokot	West Pokot ASAL Programme	Stage I 1982-85 Stage II 1985-88	Boreholes, wells, springs	0.12	Renewable 2 yrs
RDF	Countrywide	Rural Water Supplies		Boreholes, wells, pans, dams		
EEC	Countrywide	Micro-project		" " "		
EEC	Machokos	Machokos Integrated Dev. Project	Stage I 1979-83 Stage II 1983-87	Dams, pans, wells, rock catchment, spring protection	3.12	16.53

-----  
From Table 1 a summary of activities can be made as follows:

- There are at least 12 donor agencies working in some 14 ASAL districts.
- Programme generally run for three to four years and the majority has been extended to a stage II.
- The largest programmes varying in an annual budget from US\$1.29 m to US\$3.12 m occur in only three districts, Turkana, Kitui, Baringo and Machokos.
- In the remaining 11 districts the annual budgets range from US\$0.04 m to US\$1.8 m.
- Activities range from wells to boreholes, sand dams, gravity supplies, roof catchments, rock catchments, springs, pans and dams.

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Comparison of different types of Roof Catchment Tanks

Type of Tank	Volume (m3)	Cost* US\$/m3	Comments
Oil drum	0.2	95	This is the most common type of storage tank used. Although cheap it is too small for most purposes.
Corrugated Iron	1 5 10	55 24 22	Must be transported to site. Not very durable. Rusts easily especially in marine environment.
Brick/Cement	1-1000	38-56	This cost assumes a standard engineering design.
Ghala Basket	1-8	156-375	2000-3000 have already been constructed in Kenya with varying degrees of success
Cement Jars	1-10	31-47	Larger jars require wire reinforcement
Ferrocement	1-200	13-25	This new rapidly expanding technology has the advantage of producing relatively large tanks. Amref have developed a weld mesh tank (6 m3) which is promising but not widely tested). However it is cheap.
Concrete Ring	1-25	22	These tanks are simpler to build than ferrocement
Sub-surface	1-100	9-28	Although cheap these tanks require excavation and some means of lifting the water
Adobe brick	1-5	1.3-3.2	This technology has not yet been fully tested.
PVC Kit	1-100	Expensive	Long-term problems caused by UV light

\* These estimates were based on information from projects visited in May and June 1984.

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Kenya Hand pumps

Pump	Depth m	Capital Cost US\$	Remarks
80 x 81	15	460	These pumps are manufactured by the Dutch either in Holland or Tanzania. They are used in the western province project and in the GTZ Lake Kenyatta settlement project.
SWN	30	590	
NIRA AF	12	220	Manufactured in Finland and in use in Finida projects in Western Province.
	35	315	
India MK II	21	390	Imported from India, now being manufactured under the name of WECO and being used extensively.
Dempster	20	480	Used on MIDP but discontinued on account of poor performance.
Malawi Malder	21	390	Similar to WECO with some better characteristics being tested at Kwale.
Blair Zimbabwe	512	94	Prone to high frequency of failure on account of design errors and quality control. Should not be used until better tested.
Mono	40	1125	Only tried at Thika as demonstration. Excellent design but costs too high. can pump 15-20 l/min.

-----  
Hand pump costs range in cost from 3500/- (US\$220) to 9400/- (US\$590). The most extensively used at present is the India MK II which is manufactured locally under the name of WECO. Other makes such as the Dutch SWM 80 and 81, the Finnish Mira, the Dempster and Malawi Malder.



ANNEX 7  
Table 4

KENYA  
ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT  
Water Harvesting Cost Estimates

(US\$)

Trapezoidals

Slope	%	Vol. of Bunds m <sup>2</sup>	Area ha	m <sup>3</sup> /ha	cost/ha	cost/family
1:200	0.5	260	0.32	800	585	293
1:100	1.0	380	0.32	1,188	869	434
1:50	2.0	730	0.32	2,281	1,668	834
1:40	2.5	950	0.32	2,970	2,172	1,086

Semi Circle

1:200	0.5	15	0.033	450	329	165
1:100	1.0	20	0.033	670	490	245
1:50	2.0	35	0.033	1,060	775	388
1:40	2.5	40	0.033	1,210	885	443
1:33	3.0	50	0.033	1,510	1,104	552

Contour Ridging (40 cm ridge)

3 m distance between ridges				250	183	92
				450	329	165

Terracing 'Fanya juu'

					306	153
--	--	--	--	--	-----	-----

Lokitaung Oxfam 625-1,250 313-625

Spate Irrigation Schemes

Lowrenyak (40 ha)	1,016	508
Karabanarok (150 ha)	625	313

Negarim Micro Catchments

	950	
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ANNEX 7  
Table 6

KENYA  
ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Irrigation and Drainage Branch  
Draft Forward Development Budget

86/87 - 89/90

3

Ksh x 10

Title	86/87	87/88	88/89	89/90	Total	Donor	Type of Funding
<u>Small-Scale Irrig.</u>	65.0	129.0	129.0	122.0	445	Netherlands	Grant
Constr. & Training	10.0	21.0	21.0	28.0	80	GOK	
<u>Ewaso Ngiro Cluster</u>							
Op. & Maint.	75.4	66.0	46.5	43.8	241.7	GOK	
<u>Muka Mukuu</u>	7.2	6.9	7.1	7.5	28.7	GOK	
Op. & Maint.							
<u>Mitunquu</u>	123	-	-	-	123	GTZ	Grant
Op. & Maint.	12.3	25.9	28.7	29.2	96.1	GOK	
<u>Garissa Cluster</u>	221	260	270	170.5	921.5	Danida	Grant
Constr. & Op. & Maint. Plant	8	9.6	21.9	48.5	88.0	GOK	
<u>Elgeyo/Marakwet</u>	28.6	27.0	27.0	27.0	109.6	Netherlands	
Rehab. of Irrig.	-	4.2	4.6	4.8	13.6	GOK	
<u>Turkana Cluster</u>	56.7	46.8	46.8	50.9	201.2	Norad	Grant
Constr. & Op. & Maint.	18.0	11.3	12.0	11.7	53.0	GOK	
<u>West Pokot Irrig. Cluster</u>							
	46.8	46.8	46.8	48.4	188.8	Norad	Grant
	7.9	11.3	11.9	11.3	42.4	GOK	
<u>FAO Micro. Irrig.</u>		74.0	35.2	35.8	145.0	FAO	Grant
<u>Nkondi Irrig. Scheme</u>		50.1	475	622.2	1,147.3	GTZ	Grant
			12.5	13.2	25.7	GOK	
					3,281.6		

SEWA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Water Development Outlines in ASAL Areas

Resource Inventory

EVALUATION CRITERIA	DOMESTIC AND LIVESTOCK WATER DEVELOPMENT SURFACE				SUBSURFACE		WATER HARVESTING			SMALL-SCALE IRRIGATION				
	Reef Basins Catchment	Springs	Gravity	Hydraulic Pans/ Dams	Wells	Sand Dams	Boreholes	Terracing	Estimate harvesting	Spare Irrigation	Micro Catchment	Low Cost Gravity	Medium Cost Gravity	Micro
Water resources	RF	CV	PR	PR	CV	FF	CU	RF	RF/RO	FF	RF/RO	RF	RF	RF/CM
Topographical site conditions	-	Undulating	River channel stable steep gradient	Hydraulic Pans/ Turbine pumps	10-15m	Sand Dams	10-15m	at 3C	up to 3C	up to 3C	-	1-3C	3C	3C
Agro-climatic	V,VI	V	V	V	V-VII	V-VII	V-VII	U	V-VII	V-VII	V-VII	V-VII	V-VII	V-VII, Z
Energy for Oper- ation	nil	nil	nil	PR	PR	PR	Direct wind- mills solar animal pump	nil	nil	nil	nil	nil	nil	Wind so animal
Target group	SH Schools, hospitals	Schools, hospitals	Schools, hospitals	Schools, hospitals	Schools, hospitals	Schools, hospitals	Schools, hospitals	SH	SH/P	SH/P	SH/P	SH/P	SH/P	SH/P
Planning & Design/Im- plementation	MOU, MOA, Epat.	MOU, MOA, Epat.	MOU, MOA, Epat.	MOU, MOA, Epat.	MOU, MOA, Epat.	MOU, MOA, Epat.	MOU, MOA, Epat.	MOA	Epat. MOA	Epat. MOA	Epat. MOA	Epat. MOA	Epat. MOA	Epat. MOA
Implementation & SH capacity	MOU, MOA, MR	SH, MOU, MOA, Good	SH, MOU, MOA, Good	SH, MOU, MOA, Good	SH, MOU, MOA, Good	SH, MOU, MOA, Good	SH, MOU, MOA, Good	SH	MOA, SH Low	MOA, SH Low	MOA, SH Low	MOA, SH Low	MOA, SH Low	MOA, SH Low
Knowledge of Technology	Good	Good	Limited	Low	Good	Good	Good	Good	Limited	Limited	Limited	Low	Low	Low
Beneficiary In- volvement & Cost Sharing	100% (2%)	70%-80%	70%-80%	100-20%	up to 100%	up to 100%	up to 100%	100%	FW	FW	FW	FW	FW	30-50%

EVALUATION CRITERIA	DOMESTIC AND LIVESTOCK WATER DEVELOPMENT SURFACE										SUBSURFACE				WATER HARVESTING				SMALL-SCALE IRRIGATION			
	Used on exist- ing performance	Reef Tanks	Rainwater Catchment	Rect Catchment	Springs	Gravity	Hydraulic Rains & Turbine pumps	Pans/ Dams	Wells/ Dams	Boreholes	Interacting harvesting	Spate Irrigation	Spate Irrigation	Micro Catchment	Low Cost Grassy	Medium Cost Grassy	High Cost Grassy	Micro Catchment	Micro Catchment			
Adoption Rate	High	High	High	High	High	High	Good with storage	High	High	Low	High	Low	Low	Low	Good	Low	?					
Maintenance and operation benefits to pay	Low	Low	Low	Low	Low	Medium	High	Medium	High	High	Medium	High	High	Medium	Medium	High	High					
Sustainability	100%	100%	100%	100%	100%	100%	Low silt- ation	Variable	Good	Low	100%	Low	Low	Low	Good	Low	?					
No. of benefici- aries/plot size	7	400	600-800	200-300	100-500	100-300	1000-5000	200-300	100-1000	1000-3000	1/2 ha	1/2 ha	1/2 ha	Each	1/2 ha	(1/2 ha - 1 ha	?					
Cost per hectare	-	-	-	-	-	-	-	-	-	-	4900	2,931-31,750	10,000-15,250	38	6,000- 100,000	300,000	?					
Cost per person/ family	1200- 2,600	1000- 2,600	154	230	165	340	130-450	165	340	130-450	2450	1,470-17,380	5,000-9,130	-	2,400- 16,000	160,000						
Potential (imp.) used	Limited	Limited	Limited to perennial streams	Limited to perennial streams	Limited to perennial streams	Limited to perennial streams	Whole area	Limiting in VII	Stream & river beds	Variable in all areas	Confined to 10 & parts of V	All areas	All areas	All areas	Limited to RP	Limited to RP	Limited to RP	Limited to RP				
Existing invest- ment commitment	Low	Low	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High			
Scope for further investment oppor- tunities	Low	Low	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High			
Ranking of Options	3	4	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7			

Sh = Shellholder  
C = Community  
L = Livestock  
G = Groundwater  
PR = Perennial River  
FF = Flood Flow  
RF = River Flow  
HP = Hand Pump

The inventory uses criteria based on subjective evaluation of the overall performance of existing water projects. The parameters used for ranking technologies include:

Water resource identifies from where water is obtained.

Topographical site conditions describes where the technology is most suitable.

Agro climatic zones- shows where technology is most applicable in ASAL areas.

Energy for operation relates to method of water abstraction.

Target group signifies for whom water development is required.

Planning identifies who has undertaken designs and extent of expatriate involvement.

Implementation signifies which authority undertakes implementation including self-help and gives an indication of success rate.

Knowledge of technology is around understanding of its use.

Beneficiary involvement and cost sharing refers to degree that beneficiaries are involved at the inception and planning stage as well as cost sharing in the form of provision of labour.

Adoption rate refers to what extent have beneficiaries accepted a water project as viable and this is dependent upon reliability of supply and improved production yield.

Maintenance. level and to what extent beneficiaries pay maintenance costs.

Sustainability. Degree of self operation and maintenance by beneficiary without Government recurrent expenditure, and a sense of belonging that scheme is theirs.

Number of Beneficiaries/Plot size for water supply projects. Number of users will vary from a family for a roof catchment, a few hundred being served by a well to several thousand from a pan, dam, borehole, etc.. Average daily consumption of livestock has been taken to be the same as for domestic. In water harvesting plots normal plot size is about 1/2 ha per family. In irrigation schemes plot sizes tend to be even smaller.

Cost per hectare is only applicable to water harvesting and irrigation.

Cost per person/family. Has been derived from the capital cost of the water project and the number of people served. For water harvesting and irrigation costs per family holdings have been tabulated.

Potential. Considers overall scope for replicability in all ASAL areas.

Existing Investment Commitment. This has not been qualified but gives extent of existing funding activity in Districts.

Scope for further investment opportunities. This indicates where additional funding could be placed in areas of existing funding as well as new areas.

SMALL-SCALE IRRIGATION

Terms of Reference

- Object: To prepare a paper for presentation to the workshop in ASAL development entitled, 'The Place of Small-Scale Irrigation in ASAL Development.'
- Qualifications: A degree in agriculture or engineering with seven years experience of small-scale irrigation schemes particularly in ASAL areas. The incumbent would have an appreciation of problems associated with development and management of irrigation schemes by pastoral and/or agropastoral communities.
- Terms of Reference: The incumbent would draw upon the considerable data available in Kenya to draw up criteria for the development of small-scale irrigation schemes in ASAL area. Criteria would include site selection, irrigation type (including spate irrigation), structures and on field development and management. Both full and supplementary irrigation would be considered. Suggestions would be made as to the maximum allowable cost per ha. command, the extent to which this should be financed by Government, possible arrangements for repayment, levels of subsidy and responsibility for maintenance. Maximum allowable cost would be compared with alternative engineering developments including terracing and water harvesting which may in certain circumstances be an effective alternative to supplementary irrigation.

**KENYA**  
**ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT**

ANNEX 7  
 Appendix 2  
 Page 1

**Climatic Data**

COUNTRY : KENYA \* STATION : LOKITANG \* NUMBER : 63610  
 \* LATITUDE : 4 13 \* LONGITUDE : 35 45 \* ELEVATION : 730 MET

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
PRECIPITATION	12	17	53	119	47	22	32	13	7	13	32	28	395
TEMP AVERAGE	28.0	28.5	28.2	26.0	26.6	26.6	25.7	25.7	26.8	26.8	27.1	26.8	26.9
TEMP MEAN MAX	33.2	33.8	33.2	31.0	31.0	31.0	30.5	30.5	31.6	31.6	32.1	31.6	31.8
TEMP MEAN MIN	22.7	23.2	23.2	21.0	22.1	22.1	21.0	21.0	22.1	22.1	22.1	22.1	22.1
TEMP MEAN DAY	29.8	30.4	30.0	27.8	28.1	28.1	27.5	27.5	28.5	28.5	28.9	28.5	28.6
TEMP MN NIGHT	24.1	24.6	24.4	24.2	24.9	24.9	24.0	24.0	25.1	25.1	25.2	25.1	25.1
VAPOUR PRESS	21.1	22.7	23.0	23.0	22.5	20.8	20.5	20.1	20.1	21.6	22.0	22.0	21.7
WIND SPEED 2M	3.7	4.3	4.0	2.9	3.3	3.7	3.8	3.7	4.1	4.1	4.3	4.0	3.8
SUNSHINE %	84	81	75	78	83	83	76	83	88	84	76	81	81
TOT RADIATION	530	548	545	552	550	535	515	557	587	563	510	510	541
EVAPOTRANSPIR	184	181	194	156	169	168	166	175	190	187	171	170	2111

TYPE OF GROWING SEASON : INTERMEDIATE SEASON  
 DRY DAYS : 333 INTERM DAYS : 32 WET DAYS : 0

SEASON NR : 1  
 SEASON BEGINS ON 30 MAR  
 END OF SEASON ON 1 MAY  
 TOTAL LENGTH OF SEASON IS 33 DAYS

COUNTRY : KENYA \* STATION : LODHAR \* NUMBER : 63612  
 \* LATITUDE : 3 07 \* LONGITUDE : 35 37 \* ELEVATION : 515 MET

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
PRECIPITATION	15	8	27	56	27	6	23	10	2	9	21	16	220
TEMP AVERAGE	28.8	29.8	30.2	29.6	29.7	29.0	28.2	28.5	29.3	29.8	29.0	28.6	29.2
TEMP MEAN MAX	35.5	36.5	36.0	35.0	34.8	34.1	33.0	33.3	34.8	35.2	34.6	34.5	34.8
TEMP MEAN MIN	22.2	23.1	24.3	24.3	24.6	24.0	23.5	23.5	23.8	24.5	23.5	22.6	23.7
TEMP MEAN DAY	31.2	32.2	32.3	31.6	31.3	30.9	30.0	30.2	31.3	31.8	31.0	30.7	31.2
TEMP MN NIGHT	26.5	27.4	28.1	27.7	27.8	27.2	26.5	26.6	27.3	27.9	27.0	26.3	27.2
VAPOUR PRESS	17.0	17.0	19.3	22.0	22.0	20.3	19.5	19.5	18.7	18.7	19.0	19.0	19.3
WIND SPEED 2M	2.6	2.8	3.0	2.8	2.8	2.4	2.4	2.8	3.0	3.2	2.8	2.4	2.8
SUNSHINE %	84	81	75	78	83	83	76	83	88	84	76	81	81
TOT RADIATION	537	553	546	550	545	529	509	553	587	567	516	517	542
EVAPOTRANSPIR	193	191	202	183	186	169	165	183	194	205	175	167	2213

TYPE OF GROWING SEASON : ALL YEAR ROUND DRY  
 DRY DAYS : 365 INTERM DAYS : 0 WET DAYS : 0

COUNTRY : KENYA \* STATION : MANDERA \* NUMBER : 63624  
 \* LATITUDE : 3 56 \* LONGITUDE : 41 52 \* ELEVATION : 331 MET

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
PRECIPITATION	1	4	25	86	27	0	0	1	2	42	34	8	228
TEMP AVERAGE	28.8	29.8	31.0	29.8	29.0	28.5	27.8	28.0	28.8	28.6	28.3	28.5	28.9
TEMP MEAN MAX	35.2	36.0	36.7	34.8	33.8	33.5	32.5	33.1	34.2	33.5	33.3	34.3	34.2
TEMP MEAN MIN	22.3	23.5	25.2	24.8	24.3	23.6	23.0	23.0	23.3	23.7	23.3	22.7	23.6
TEMP MEAN DAY	31.1	32.0	33.0	31.6	30.8	30.5	29.5	29.9	30.7	30.4	30.1	30.6	30.8
TEMP MN NIGHT	26.5	27.5	28.9	28.0	27.3	26.7	26.0	26.2	26.7	26.8	26.4	26.3	26.9
VAPOUR PRESS	19.5	20.3	22.5	25.2	24.3	21.2	20.0	19.3	20.1	23.3	24.0	22.1	21.8
WIND SPEED 2M	1.9	2.0	1.8	1.4	2.0	2.9	3.1	2.9	2.5	1.5	1.4	1.8	2.1
SUNSHINE %	83	85	75	69	65	70	64	69	72	65	70	75	71
TOT RADIATION	528	564	545	518	484	488	471	505	527	494	490	491	508
EVAPOTRANSPIR	167	166	181	155	156	165	170	177	173	151	139	150	1950

TYPE OF GROWING SEASON : INTERMEDIATE SEASON  
 DRY DAYS : 340 INTERM DAYS : 25 WET DAYS : 0

SEASON NR : 1  
 SEASON BEGINS ON 3 APR  
 END OF SEASON ON 28 APR  
 TOTAL LENGTH OF SEASON IS 26 DAYS

COUNTRY : KENYA \* STATION : MARSABIT \* NUMBER : 63641  
 \* LATITUDE : 2 18 \* LONGITUDE : 37 54 \* ELEVATION : 1345 MET

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
PRECIPITATION	38	16	74	229	106	10	18	19	12	107	120	68	817
TEMP AVERAGE	20.8	21.0	21.0	20.8	20.1	19.0	18.5	18.2	18.8	19.6	20.0	19.3	19.8
TEMP MEAN MAX	25.5	26.0	25.5	25.0	24.3	23.8	23.8	23.2	24.3	24.3	23.8	23.2	24.4
TEMP MEAN MIN	16.0	16.0	16.4	16.6	16.0	14.3	13.2	13.2	13.2	13.0	16.0	15.5	15.1
TEMP MEAN DAY	22.3	22.8	22.7	22.3	21.6	20.8	20.4	20.0	20.7	21.3	21.3	20.7	21.4
TEMP MN NIGHT	19.0	19.2	19.4	19.3	18.6	17.3	16.6	16.4	16.7	17.9	18.5	17.9	18.1
VAPOUR PRESS	18.5	19.5	20.3	20.7	20.0	18.0	16.7	16.6	16.8	18.0	19.0	19.3	18.6
WIND SPEED 2M	2.3	2.3	2.9	2.6	2.5	2.5	2.2	2.5	2.5	2.2	2.0	2.0	2.4
SUNSHINE %	66	62	30	42	52	62	60	58	65	54	44	30	35
TOT RADIATION	479	486	452	414	431	452	450	460	501	457	405	415	450
EVAPOTRANSPIR	119	111	120	105	105	100	103	107	114	113	99	96	1292

TYPE OF GROWING SEASON : NORMAL GROWING SEASON (WITH DRY PERIOD)  
 DRY DAYS : 197 INTERM DAYS : 74 WET DAYS : 94

SEASON NR : 1  
 SEASON BEGINS ON 13 MAR  
 BEGIN HUMID ON 27 MAR  
 HUMID PERIOD ( 50 DAYS) ENDS ON 15 MAY  
 END OF SEASON ON 30 MAY  
 TOTAL LENGTH OF SEASON IS 79 DAYS  
 SEASON NR : 2  
 SEASON BEGINS ON 30 SEP  
 BEGIN HUMID ON 17 OCT  
 HUMID PERIOD ( 46 DAYS) ENDS ON 1 DEC  
 END OF SEASON ON 29 DEC  
 TOTAL LENGTH OF SEASON IS 91 DAYS

ANNEX 7  
APPENDIX 2  
Page 2

COUNTRY : KENYA \* STATION : NAROK \* NUMBER : 63737

\* LATITUDE : -1.00 \* LONGITUDE : 35 50 \* ELEVATION : 1890 MET

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
PRECIPITATION	69	75	102	140	91	27	14	21	21	25	62	71	718
TEMP AVERAGE	17.3	17.2	17.5	17.5	17.6	15.5	14.6	15.1	15.8	16.6	16.5	16.4	16.5
TEMP MEAN MAX	26.5	27.0	26.5	24.5	22.6	21.8	21.5	22.3	24.5	25.8	25.3	25.5	24.5
TEMP MEAN MIN	7.7	7.5	8.5	10.7	11.2	9.0	7.8	8.0	7.2	7.3	7.7	8.0	8.4
TEMP MEAN DAY	20.5	20.7	20.7	20.1	18.9	17.7	17.1	17.7	19.0	19.9	19.7	19.9	19.5
TEMP MN NIGHT	13.6	13.7	14.2	15.1	14.8	13.1	12.2	12.6	12.7	13.3	13.3	13.6	13.5
VAPOUR PRESS	12.1	12.0	13.2	15.2	15.3	13.6	12.5	12.5	12.3	12.3	13.0	13.1	13.1
WIND SPEED 2M	1.7	2.0	2.0	2.2	2.2	2.0	2.1	2.1	2.5	2.5	2.1	1.7	2.1
SUNSHINE %	73	69	66	56	50	62	54	54	61	63	63	62	61
TOT RADIATION	497	505	507	455	446	439	401	421	465	478	493	499	467
EVAPOTRANSPIR	127	122	132	107	98	87	91	102	121	134	116	114	1351

TYPE OF GROWING SEASON : NORMAL GROWING SEASON (WITH DRY PERIOD)  
 DRY DAYS : 161 INTERM DAYS : 162 WET DAYS : 42

SEASON NR : 1  
 SEASON BEGINS ON 10 NOV  
 BEGIN HUMID ON 30 MAR  
 HUMID PERIOD ( 43 DAYS) ENDS ON 11 MAY  
 END OF SEASON ON 2 JUNE  
 TOTAL LENGTH OF SEASON IS 205 DAYS

COUNTRY : KENYA \* STATION : MAGADI \* NUMBER : 63738

\* LATITUDE : -1.53 \* LONGITUDE : 36.17 \* ELEVATION : 622 MET

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
PRECIPITATION	32	43	66	89	55	8	1	3	5	15	34	47	398
TEMP AVERAGE	30.2	30.6	30.6	29.0	28.0	27.5	27.0	27.6	28.8	30.0	29.5	29.2	29.0
TEMP MEAN MAX	37.0	37.5	37.0	34.5	33.0	32.6	32.2	33.1	35.0	36.3	35.5	35.5	34.9
TEMP MEAN MIN	23.6	23.8	24.2	23.5	23.0	22.2	21.7	22.2	22.7	23.8	23.6	23.1	23.1
TEMP MEAN DAY	32.7	33.1	32.9	31.0	29.8	29.3	28.8	29.6	31.1	32.3	31.7	31.3	31.1
TEMP MN NIGHT	27.8	28.1	28.2	27.0	26.2	25.5	25.0	25.7	26.6	27.8	27.4	27.1	26.9
VAPOUR PRESS	17.6	17.3	18.8	21.1	20.5	17.3	15.8	16.0	16.5	16.8	18.8	18.8	17.9
WIND SPEED 2M	1.2	1.3	1.8	1.4	1.2	1.4	1.4	1.4	1.5	1.5	1.7	1.4	1.5
SUNSHINE %	80	82	70	64	68	72	72	72	78	72	68	72	72
TOT RADIATION	553	576	530	486	469	463	470	496	546	533	510	516	512
EVAPOTRANSPIR	168	166	182	146	136	130	134	145	161	172	159	159	1858

TYPE OF GROWING SEASON : INTERMEDIATE SEASON  
 DRY DAYS : 330 INTERM DAYS : 35 WET DAYS : 0

SEASON NR : 1  
 SEASON BEGINS ON 31 MAR  
 END OF SEASON ON 5 MAY  
 TOTAL LENGTH OF SEASON IS 36 DAYS

COUNTRY : KENYA \* STATION : KITUI (AGRIC) \* NUMBER : 63746

\* LATITUDE : -1.22 \* LONGITUDE : 38.01 \* ELEVATION : 1090 MET

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
PRECIPITATION	41	24	118	244	56	5	3	5	6	82	304	143	1031
TEMP AVERAGE	21.8	23.0	23.5	22.5	21.6	20.1	19.3	19.6	20.5	21.8	21.6	21.3	21.4
TEMP MEAN MAX	27.7	29.3	30.0	27.7	26.6	26.0	25.0	25.5	27.1	28.2	26.6	26.0	27.1
TEMP MEAN MIN	16.0	16.6	17.1	17.1	16.6	14.3	13.8	13.8	13.8	15.3	16.6	16.6	15.7
TEMP MEAN DAY	23.9	25.2	25.9	24.3	23.4	22.3	21.4	21.8	22.8	24.1	23.4	23.0	23.5
TEMP MN NIGHT	19.7	20.6	21.2	20.5	19.8	18.0	17.4	17.5	18.0	19.6	19.8	19.6	19.3
VAPOUR PRESS	16.5	18.0	18.5	20.0	19.0	16.1	15.0	14.7	15.0	16.0	19.0	19.8	17.5
WIND SPEED 2M	2.3	2.3	2.3	2.2	2.6	2.6	2.8	3.1	2.8	3.2	2.6	2.8	2.7
SUNSHINE %	82	84	70	59	60	57	39	54	63	67	63	70	64
TOT RADIATION	582	612	559	495	472	441	374	435	512	535	505	522	505
EVAPOTRANSPIR	137	143	155	123	119	108	110	126	141	157	126	126	1571

TYPE OF GROWING SEASON : NORMAL GROWING SEASON (WITH DRY PERIOD)  
 DRY DAYS : 216 INTERM DAYS : 58 WET DAYS : 91

SEASON NR : 1  
 SEASON BEGINS ON 5 MAR  
 BEGIN HUMID ON 24 MAR  
 HUMID PERIOD ( 40 DAYS) ENDS ON 2 MAY  
 END OF SEASON ON 12 MAY  
 TOTAL LENGTH OF SEASON IS 70 DAYS

SEASON NR : 2  
 SEASON BEGINS ON 16 OCT  
 BEGIN HUMID ON 28 OCT  
 HUMID PERIOD ( 53 DAYS) ENDS ON 19 DEC  
 END OF SEASON ON 4 JAN  
 TOTAL LENGTH OF SEASON IS 81 DAYS

COUNTRY : KENYA \* STATION : MACHAKOS SCHOOL \* NUMBER : 63759

\* LATITUDE : -1.31 \* LONGITUDE : 37.17 \* ELEVATION : 1680 MET

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
PRECIPITATION	49	53	124	210	76	12	5	6	9	53	189	122	908
TEMP AVERAGE	20.3	20.7	20.6	20.0	19.0	18.0	17.0	17.5	19.0	19.7	19.7	19.5	19.3
TEMP MEAN MAX	26.2	27.6	26.7	25.3	24.2	23.2	22.5	22.7	24.8	26.1	25.0	24.2	24.9
TEMP MEAN MIN	13.6	13.7	14.5	14.7	14.2	12.7	11.6	12.2	12.5	13.3	14.3	14.3	13.5
TEMP MEAN DAY	22.2	23.1	22.8	21.9	21.0	19.8	19.0	19.3	20.9	22.0	21.6	21.0	21.2
TEMP MN NIGHT	17.6	18.1	18.4	18.1	17.4	16.0	15.1	15.5	16.4	17.4	17.9	17.5	17.5
VAPOUR PRESS	17.2	17.1	18.2	18.8	18.0	15.6	15.1	15.0	15.1	16.2	17.8	17.6	16.8
WIND SPEED 2M	2.0	1.4	1.7	1.5	1.7	1.5	1.7	1.8	1.8	2.0	1.8	2.2	1.8
SUNSHINE %	94	93	82	69	67	67	50	39	65	75	70	76	70
TOT RADIATION	601	615	576	506	469	449	398	382	499	544	515	527	506
EVAPOTRANSPIR	135	125	133	110	101	91	89	96	117	130	114	119	1360

TYPE OF GROWING SEASON : NORMAL GROWING SEASON (WITH DRY PERIOD)  
 DRY DAYS : 200 INTERM DAYS : 68 WET DAYS : 97

SEASON NR : 1  
 SEASON BEGINS ON 22 FEB  
 BEGIN HUMID ON 19 MAR  
 HUMID PERIOD ( 30 DAYS) ENDS ON 7 MAY  
 END OF SEASON ON 23 MAY  
 TOTAL LENGTH OF SEASON IS 91 DAYS

SEASON NR : 2  
 SEASON BEGINS ON 20 OCT  
 BEGIN HUMID ON 30 OCT  
 HUMID PERIOD ( 49 DAYS) ENDS ON 17 DEC  
 END OF SEASON ON 3 JAN  
 TOTAL LENGTH OF SEASON IS 76 DAYS



COUNTRY	KENYA		STATION HARALAL		NUMBER 63664		ELEVATION 1950		MET		YEAR		
		* LATITUDE: 1 05		* LONGITUDE: 36 42									
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
PRECIPITATION	11	19	38	85	69	54	109	92	30	39	52	22	620
TEMP AVERAGE	16.0	16.6	17.3	17.6	17.0	15.9	15.2	15.0	15.2	16.0	16.0	15.6	16.1
TEMP MEAN MAX	25.0	26.0	25.3	24.0	23.6	22.8	21.5	21.1	22.5	23.7	22.8	23.0	23.4
TEMP MEAN MIN	7.0	7.3	8.2	11.0	10.2	8.5	9.0	8.7	7.5	8.1	8.1	8.0	8.6
TEMP MEAN DAY	19.2	20.0	20.1	19.8	19.3	18.0	17.5	17.1	17.7	18.7	18.1	18.2	18.7
TEMP MN NIGHT	12.7	13.3	14.3	15.1	14.5	13.0	12.6	12.2	13.0	12.7	12.7	12.7	13.3
VAPOUR PRESS	12.8	13.0	14.1	15.3	15.0	14.0	14.1	14.3	13.8	14.8	14.6	14.5	14.3
WIND SPEED 2M	0.9	1.1	1.2	0.7	0.7	0.7	0.5	0.6	0.6	0.8	1.1	1.1	0.8
SUNSHINE %	80	82	74	65	70	75	65	65	75	70	65	65	70
TOT RADIATION	536	565	544	497	490	490	461	482	537	520	486	474	506
EVAPOTRANSPIR	105	105	119	100	96	85	84	89	97	102	95	93	1170

TYPE OF GROWING SEASON : NORMAL GROWING SEASON (WITH DRY PERIOD)  
 DRY DAYS : 180 INTERM. DAYS : 135 WET DAYS : 50  
 SEASON NR : 1  
 SEASON BEGINS ON 29 MAR  
 BEGIN HUMID ON 30 JUNE  
 HUMID PERIOD ( 31 DAYS) ENDS ON 19 AUG  
 END OF SEASON ON 2 SEP  
 TOTAL LENGTH OF SEASON IS 158 DAYS  
 SEASON NR : 2  
 SEASON BEGINS ON 31 OCT  
 END OF SEASON ON 28 NOV  
 TOTAL LENGTH OF SEASON IS 29 DAYS

COUNTRY	KENYA		STATION WAJIR		NUMBER 63671		ELEVATION 244		MET		YEAR		
		* LATITUDE: 1 45		* LONGITUDE: 40 04									
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
PRECIPITATION	5	5	23	68	33	1	3	2	6	26	61	21	254
TEMP AVERAGE	26.6	29.2	29.8	28.8	27.4	26.8	26.0	26.1	27.0	27.6	27.5	27.8	27.8
TEMP MEAN MAX	35.2	36.0	35.8	34.1	33.0	32.3	31.3	31.8	32.8	33.2	33.0	33.5	33.5
TEMP MEAN MIN	22.0	22.5	23.7	23.6	22.7	21.3	20.8	20.8	21.2	22.0	22.0	22.1	22.1
TEMP MEAN DAY	31.0	31.7	31.9	30.7	29.7	26.8	27.9	28.3	29.1	29.6	29.5	29.8	29.8
TEMP MN NIGHT	24.2	24.8	27.6	26.9	26.0	24.8	24.1	24.3	24.9	25.5	25.5	25.7	25.7
VAPOUR PRESS	23.0	23.5	24.6	26.3	25.5	23.1	21.7	21.6	22.5	22.7	24.8	25.1	23.7
WIND SPEED 2M	2.0	2.2	1.9	2.0	2.3	2.8	2.8	2.5	2.5	1.9	2.0	2.0	2.2
SUNSHINE %	79	75	62	51	56	61	56	53	61	62	50	63	59
TOT RADIATION	528	536	498	446	443	466	433	441	482	431	429	463	466
EVAPOTRANSPIR	171	165	170	142	142	139	141	143	151	146	132	142	1784

TYPE OF GROWING SEASON : INTERMEDIATE SEASON  
 DRY DAYS : 335 INTERM. DAYS : 10 WET DAYS : 0  
 SEASON NR : 1  
 SEASON BEGINS ON 14 APR  
 END OF SEASON ON 24 APR  
 TOTAL LENGTH OF SEASON IS 11 DAYS

COUNTRY	KENYA		STATION ISIOLO		NUMBER 63693		ELEVATION 1104		MET		YEAR		
		* LATITUDE: 0 21		* LONGITUDE: 37 35									
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
PRECIPITATION	33	33	87	127	34	3	7	5	5	65	139	75	613
TEMP AVERAGE	23.2	24.2	24.6	23.8	23.8	23.1	22.5	22.8	23.8	24.2	23.5	22.2	23.4
TEMP MEAN MAX	30.7	32.2	31.6	30.0	29.8	29.5	28.8	29.3	30.7	30.8	28.5	29.0	30.1
TEMP MEAN MIN	15.6	16.2	17.5	17.7	17.7	16.3	16.2	16.5	16.8	17.5	16.5	15.5	16.7
TEMP MEAN DAY	23.9	27.1	27.1	26.1	25.9	25.4	24.8	25.2	26.2	26.5	24.7	24.7	25.8
TEMP MN NIGHT	20.4	21.3	22.0	21.6	21.5	20.8	20.2	20.6	21.2	21.7	20.3	19.8	21.0
VAPOUR PRESS	16.0	15.6	16.7	18.7	18.2	16.5	15.7	15.5	15.5	16.2	18.1	17.8	16.7
WIND SPEED 2M	2.0	2.0	2.5	2.5	3.3	3.8	4.1	4.1	3.8	2.8	1.8	1.8	2.9
SUNSHINE %	78	81	72	69	76	78	72	71	78	69	61	68	72
TOT RADIATION	533	564	537	510	508	496	481	501	548	518	475	489	513
EVAPOTRANSPIR	158	155	178	147	158	155	163	174	187	174	124	131	1904

TYPE OF GROWING SEASON : NORMAL GROWING SEASON (WITH DRY PERIOD)  
 DRY DAYS : 262 INTERM. DAYS : 77 WET DAYS : 26  
 SEASON NR : 1  
 SEASON BEGINS ON 17 MAR  
 END OF SEASON ON 1 MAY  
 TOTAL LENGTH OF SEASON IS 46 DAYS  
 SEASON NR : 2  
 SEASON BEGINS ON 23 OCT  
 BEGIN HUMID ON 4 NOV  
 HUMID PERIOD ( 27 DAYS) ENDS ON 30 NOV  
 END OF SEASON ON 20 DEC  
 TOTAL LENGTH OF SEASON IS 59 DAYS

COUNTRY	KENYA		STATION GARISSA		NUMBER 63723		ELEVATION 147		MET		YEAR		
		* LATITUDE: -0 28		* LONGITUDE: 39 38									
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
PRECIPITATION	10	6	26	55	17	5	2	5	4	22	65	65	282
TEMP AVERAGE	28.8	29.3	30.5	30.2	29.0	27.1	26.6	26.8	27.7	28.8	29.3	28.8	28.6
TEMP MEAN MAX	35.5	36.0	36.6	36.0	35.0	32.7	32.1	32.7	33.8	35.0	35.0	34.3	34.6
TEMP MEAN MIN	22.1	22.7	24.3	24.3	23.2	21.6	21.0	21.0	21.6	22.7	23.8	23.2	22.6
TEMP MEAN DAY	31.2	31.7	32.7	32.2	31.2	29.1	28.5	29.0	29.9	31.1	31.4	30.7	30.7
TEMP MN NIGHT	26.3	26.9	28.2	28.0	26.9	25.1	24.5	24.7	25.5	26.6	27.4	26.7	26.4
VAPOUR PRESS	23.5	24.0	25.2	26.2	24.5	22.1	20.8	20.7	21.2	22.6	25.1	25.5	23.5
WIND SPEED 2M	1.3	1.3	1.6	1.9	2.6	2.5	2.9	3.2	3.0	2.5	1.9	1.0	2.1
SUNSHINE %	63	59	58	56	53	50	49	48	53	60	60	60	56
TOT RADIATION	499	500	500	481	439	414	413	431	469	500	452	481	468
EVAPOTRANSPIR	152	141	166	153	154	133	144	156	168	175	151	136	1829

TYPE OF GROWING SEASON : INTERMEDIATE SEASON  
 DRY DAYS : 348 INTERM. DAYS : 17 WET DAYS : 0  
 SEASON NR : 1  
 SEASON BEGINS ON 28 NOV  
 END OF SEASON ON 15 DEC  
 TOTAL LENGTH OF SEASON IS 18 DAYS

KENYAARID AND SEMI-ARID LANDS DEVELOPMENTLIVESTOCKTable of Contents

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APPENDIX

1. Terms of Reference

KENYA

ARID AND SEMI-ARID LANDS DEVELOPMENT

LIVESTOCK

I. BACKGROUND AND CONSTRAINTS

A. Classification

1. The ASAL areas are defined differently in different reports and sometimes there is confusion as to the meaning of the zones quoted, even within the one report. The earlier reports/studies used the ecological zones from the Kenya Atlas (1970), based on Pratt et alia (1966), referring to zones IV to VI as ASAL out of production zones II to VI, (see map 1, Main Report).

2. Agro-climatic: Later reports/studies have also used the Kenya Soil Survey agro-climatic classification by Braun et al (1982) based on Braun (1980). This has roughly parallel ASAL zones to those of Jatzold, zones IV-VII out of production zones I-VII. The elaboration of sub-zones (table 1) is more empirical than those of Jatzold, to be used in conjunction with the soil map in land use planning and for evaluation of ecological distribution of species/genotypes of crops/forages/animal types. Groups of sub-zones correspond to the main grouping of sub-zones of Jatzold, based on topography (elevation). The agro-climatic map with its sub-zones is available as a complete map of Kenya (1:1,000,000), (see map 2, Main Report). This is the classification followed in this Annex.

3. Zone IV exclusion: In 1983 the World Bank produced an agro-climatic zone map, based on Jatzold-Braun (Map 3, Main Report). On this, zone IV is classified as medium potential, not ASAL. The "T and V" extension programmes have been designed to cover zones I to IV, high and medium potential areas. Zone IV has only 10-25% risk of failure of an adapted maize crop in any one growing season (unimodal rainfall or bimodal rainfall growing seasons), whereas the risk of failure rapidly escalates in zone V from 25 to 75%. The relationship between principle crop, subsistence farming and livestock production by agroclimatic units is shown in tables 2a and 2b.

4. The climate of Zone IV is suitable for economic development of improved pastures rather than being restricted to range improvement techniques. The occurrence of ranching in zone IV, Maasailand and West Pokot, is no criterion for inclusion of zone IV in ASAL areas. Ranching and pastoralism occur in zones I to III also, eg. West Pokot. Epp and Kilmayes (1982) produced a map showing the relationship between cultivation and ASAL areas (map 4, Main Report), in which zone IV is also excluded from ASAL areas. Table 2, showing the relationships of principal crops, farming methods and livestock production by agro-climatic zones, further highlights these points. Exclusion of zone IV makes little difference to the total area, Table 3, but reduces the ASAL population significantly.

## B. Range Condition

5. Range pasture condition in Kenya is related to a number of interacting factors, resulting in different expressions of degradation where it occurs: agro-climatic zone, natural and induced vegetation type, soil type, geological erosion sensitivity, water point development, settlement, security, fire control, seasonal water/seasonal range, animal and human diseases, land use patterns, relative human and livestock population pressures: (see Map 1 for major vegetation types).

6. Range condition does not necessarily deteriorate with increasing aridity although ground cover is less dense. In fact the zone VII nomadic areas appear more stable than the zones V-VI pastoral areas or zones IV-V mixed farming areas. The degree of overuse of grazing areas is broadly correlated to the relative climatic safety of the areas for human occupation and availability of water supplies. The pasture areas of the mixed farming belt are almost totally in severe degradation, with massive erosion problems, gullies up to two metres deep are common, with extensive loss of one metre of topsoil, in Eastern Province.

7. The zone VI "grassland with open trees", visited in Samburu country, was not only seriously denuded but sheet erosion was widespread and gully erosion was extended past geological erosion sensitive spots into the general landscape. These appeared to be medium textured soils. The lighter textured, shifting cultivation areas of zone VI bushland in Eastern Province had substantially better cover but little ground storey vegetation, with resultant sheet erosion, although little evidence of gully erosion. Insofar as browse/grass was unbalanced and much growth was out of reach of the animals, these range areas were in poor condition. But this bush growth is an essential part of the bush fallow system necessary to regenerate soil fertility. A compromise management is required for such areas.

8. The zone VII shrublands seen in NE Province were relatively stable, away from settlements and permanent water points. The dwarf shrub vegetation found in zones VI and VII provide plenty of ground cover but little useable production. The condition rating depends on whether they are accepted as natural or man induced. These ecosystems have their specific management problems.

9. Sacrifice areas: Sacrifice areas around human settlement, both town and manyatta, and permanent water points, are a feature of ASAL areas. Without specific action these areas continue to grow and deteriorate with time. In zone VII the proportion of sacrifice areas should be smaller because of the lower population. Nevertheless sacrifice areas can easily have a radius to two kilometres and more.

10. Security, seasonal grazing: Two other factors affecting range condition are security and seasonal grazing patterns. In some areas cattle raiders pose security problems for families as well as livestock. The areas more remote from raiders get increased grazing pressure whilst border territory gets grazed only as a last resort. Wet and dry season range are important aspects of reducing range deterioration. Wet season grazing makes use of temporary water availability, while dry season grazing makes use of permanent water. A balance between temporary and permanent water supplies is necessary in developing range water, to discourage year-round use; especially in the more arid areas.

### C. Diseases

#### Epizootic diseases

11. The major epizootic diseases risks of cattle in Kenya are rinderpest, contagious bovine pleuropneumonia, and, foot-and-mouth disease. The major tick-borne diseases include east coast fever, anaplasmosis, babesiosis and heartwater. Tsetse transmitted trypanosomiasis is a constraint on cattle in a number of provinces, and non cyclically transmitted trypanosomiasis is a major problem of cattle and camels in northern areas. Trypanosomiasis is also endemic in the sheep and goat population. Other important diseases of livestock are listed in table 4.

12. Livestock disease control policy in Kenya has concentrated primarily on the creation of conditions suitable to permit the introduction of exotic breeds of livestock and thus to improve the productivity of the indigenous livestock population through a process of upgrading. The principal emphasis has been on the control of infections and tick-borne diseases. The principal methods used to control infectious diseases has been vaccination and movement control. Diseases for which vaccination is compulsory in all or part of the country include rinderpest, CBPP and F&MD.

13. Disease control programmes have been centred on annual or specific campaigns against the major epidemic and endemic diseases of livestock, (principally directed at cattle); the perennial control of tick-borne diseases through dipping in the proclaimed areas (exclusively cattle), and provision of professional clinical services. Financial constraints in recent years have hindered the efficiency of campaigns and reduced coverage below the minimum required to guarantee the health of the national herd. The main effect has been seen so far in the incidence of F&MD. For this reason a major Animal Health Services Rehabilitation Programme is being funded by IFAD/World Bank.

14. In the case of rinderpest fully susceptible cattle may have mortality rates as high as 80-90%. In endemic situations, however, the innate resistance and the immune status of the cattle (exposure or vaccination) may reduce mortality to 10-40%; but the production losses in affected animals remain high (20 kg liveweight). In the case of CBPP the disease is more of a chronic nature resulting in gradual deterioration and eventual death. In fully susceptible cattle mortality may be 70% but in endemic areas 70% may recover but with high production losses (80 kg liveweight). Control measures disrupt movement patterns, prohibit sales, compound overgrazing problems and affect trade. In the case of F&MD direct losses are minimal in indigenous cattle and low in exotic breeds (5-10%) but with a more severe disruption to production with high risks of secondary effects and reduced reproduction.

15. In general, the drier ASAL areas have fewer diseases than more humid areas, but sheep and goats and camels still carry a large number of diseases and endo-ecto parasites. The economics and practicality of treatment has received insufficient attention but both the sheep and goat project and IPAL studies suggest economic benefit. Education of the producer in disease control methods and availability of treatment materials is lacking in ASAL areas. Recognition of the values of indigenous treatments is breaking down. Producers can apply some disease control more cheaply than veterinarians or animal health technicians. They assess the economic value of treatment (if they are correctly instructed in treatment methods). The extension aspects of animal health- animal husbandry need emphasis in ASAL areas.

16. Apart from the work by IPAL and ILCA there is work by other International Institutions relevant to ASAL disease problems in Kenya. There is a proposed NGO programme, F.A.R.M. to specifically look at diseases of camels and their effect on productivity. There is a government camel research station in the Wajir district but no trained staff. The FAO/UNDP sheep and goat project provided useful information.

17. Tsetse. Tsetse flies are common in some areas of zones IV-V and along rivers going through zones VI-VII (Map 3). These areas affect range condition in several ways. Large areas of severely affected tsetse country have become national parks and game reserves, or are classified as State lands. These areas normally have better cover than areas commonly grazed, but may be in poorer "range" condition depending on the definition of "condition" relative to land use.

18. In locations away from the coast other tsetse areas were held in reserve for dry season range or drought refuge, when the risks of trypanosomiasis were much less. These areas posed less risk for humans who gambled on more benefits from dry season grazing with less stock losses than the greater risks from lack of feed in the rest of the range. Some of the river forest tsetse country is now also used as wet season range, with burning of vegetation at the end of the dry season to reduce tsetse and tick populations. This is causing destruction of riverine forest areas as well as reducing the drought refuges of the overall production system.

#### D. Traditional Livestock Industry and Changes in ASAL Areas

19. There are four broad systems of livestock production in the Kenya ASAL areas. These are: (i) nomadism, zone VII and VI, (ii) pastoralism, zone V and VI (& IV), (iii) shifting agriculture, zone VI and V, and (iv) mixed farming, zone V (& IV). In terms of land area nomadism is the most important but in terms of stock numbers pastoralism is more important. The area of shifting agriculture is possibly as great as the area of mixed farming.

20. There is no readily available data on human or livestock populations by land use systems, in ASAL districts. These would be only approximately available from the location/sub-location statistics. The 1978 census was incomplete for a number of reasons. Current livestock figures are estimates of change based on these figures.

21. Nomadism and Pastoralism. Traditional nomadism was based on frequent movement of small groups around a fragile, arid area, forage resource; covering large distances in annual movement. Water supplies were more limited than grazing thus protecting the environment. Large daily movements for forage and for water supplies supplemented frequent household movement. Water was often carried by camel/donkey to mixed herds of livestock rather than moving livestock to water. Milk, as an essential component of the diet came from camels, supplemented more by sheep and goats than cattle. The balance of livestock types varied between groups and areas. Traditional movements were within clan territory, following scattered rainfall events. During drought temporary changes in seasonal grazing movements brought not only clans but different tribes onto the same grazing and water resource. Population was controlled by the environment, the social system, birth control, sporadic territorial tests of strength and livestock raids.



22. Traditional pastoralism was based on a semi-sedentary existence with recognised wet and dry season ranges and refuge areas, through which production units and larger groups ranged. The smaller production units consist of household averaging around ten people, loosely combining periodically into variable groups of hundreds of members. The clan territory was more precisely defined for combinations of these larger informal groups, numbering thousands of members. Drought movement was traditionally within the clan territory, with special arrangements between clans in the event of major drought. A lot of the temporary movement of larger stock away from the semi-permanent camps was done by the young men. Large stock were taken to water rather than water to stock while water was often taken by donkey to small stock and immature stock. Milk as an essential component of the diet came from cattle, supplemented by sheep and goats. The smaller production units were proportionally more dependent on sheep and goats. Camels were absent from most pastoral systems. Population was controlled by episodic environmental catastrophes, the social system and birth control.

23. Agricultural Systems. The shifting agriculture system extends out to the boundary of zone VI-1, north and south of the Garissa road, in what is supposed to be State lands designated for ranch development. The extent of and change in shifting agriculture should be available from KREMU records. The intensity of rotation increased from east, zone VI-1, to west, zone V-1, with vegetation not recovering in the cycle before re-use near the boundary of mixed farm lands. The transition to mixed agriculture is related to rainfall, temperature and soil type. Livestock are an important part of subsistence as well as the primary income source. The fallow areas are commonly grazed and browse is the principal feed source; even the cattle are principally browsers. Sheep and goats are relatively more important than in pastoral systems. Cattle belong to the "big" owners. Water may be brought to the livestock by donkey. Water is very restricted. Movement out of the area during drought is restricted. There is some seasonal use of drier areas to the east.

24. Although the subsistence mixed farmer of the marginal zone V is heavily dependent on his livestock for cash income and his drought survival, he exhibits less concern for this asset. The density of livestock increases rapidly with increased rainfall but the numbers per person drop, the proportion of land for their use drops and maintenance of that land is nil. The grazing areas are usually common grazed. Some private grazing land exists and some individual allocation has started. Water supplies, though inadequate, are more reliable. Stock are taken to water.

25. Change. The traditional ways of nomadism and pastoralism have been very slowly changing throughout the century. The pace of this change has quickened in the past fifteen years, to the extent that conclusions drawn from research five years ago may no longer apply. The changes in the pastoral system are more rapid than in the nomadic system.

26. Population controls have broken down and health services have accentuated population growth. Land adjudication has brought with it pressures for further change. There is increasing sedentarisation in both systems with significant numbers of people living in towns/villages/sub-village manyatta groups. Often only the male members of the family are moving with the stock whilst the female and young members stay close to protection, company, schools and other facilities. In some areas schools are now building dormitories to offset this trend.

27. Availability of more permanent water supplies is a factor of sedentarisation, with women keeping small stock around the home area while the larger stock are moved away as the local grazing is depleted. These changes increase the proportion of sacrifice areas and hence the need for intervention to stabilise the resource and reclaim degraded areas.

28. Both nomadic people and pastoralists are turning more to opportunistic cropping in favourable microclimates. IPAL states that all the people in its study areas grow crops at some time. Other evidence from ILCA suggests the growing of crops is more common at the break of drought, to tide families over until milk production has reached satisfactory levels. Yet other evidence suggests that some nomadic and pastoral groups have always been opportunistic croppers and it has been wrong to discount this influence. What is clear is that the number of livestock required to support a person when grain is introduced into the diet, is less than half that required for traditional milk-meat diets. This allows better recovery from droughts, more rapid herd build-up and greater scope for offtake of progeny/matures into the market system. Both systems are now firmly part of the market system with increasing market needs and market demands (IPAL, ILCA reports and papers).

29. de Leeuw et al (1984) stated: "that in spite of over a decade of development effort at commercialisation, the production strategy of Maasai pastoralists is still primarily geared to satisfy their subsistence needs combined with a relatively low level of market-oriented offtake". This paper in fact showed a 25% market offtake from total productivity, for both small and big producers.

30. de Leeuw went on to state: "However, distinct trends in management patterns have emerged lately which point to accelerated change in traditional goals. These are: A much greater reliance on purchased grain in the diet, in particular in the dry seasons when subsistence milk is in short supply - Contraction of grazing orbits within ranch boundaries (set on the informal group level not the clan level) and an increasing reluctance to grant grazing rights to non-ranch members. A trend towards privatisation of grazing land and watering facilities, in particular by the large producers. Claims to exclusive grazing rights in reserve grazing areas for calves and small stock have become de facto recognised, while along the pipeline, investment in private connection is on the increase."

"However, contrary to developments elsewhere in Africa (eg. Botswana), a diversification in producer goals between small and large producers is not emerging. Although differences in livestock wealth have become more pronounced with time, large producers are no more commercialised than small producers. Whether this is due to a lack of alternative investment possibilities or is linked to low livestock prices in Kenya needs further analysis."

"Whether the land tenure reform, through the creation of group ranches, has led to better resource utilisation is difficult to ascertain. At present, herds and flocks tend to expand, with the few largest producers increasing their share of ranch resource use. The ultimate answer depends on whether this trend of further privatisation of land use will continue and individual land ownership will eventually become the norm. If this is the irreversible trend, a major question is how group resources will be shared among group ranch members. If each producer is allotted an equal share of the ranch territory (i.e. 250-600 ac per household), a redistribution and possibly reduction in total livestock may ensue as the large producers are forced to invest in purchase of land or grazing rights and must increase their offtake, at least temporarily. If, on the contrary, subdivision is

done according to family size or stock wealth, which is highly correlated, the process will force out the small producers and will concentrate resource management and allocation in the hands of a few large producers. Both scenarios may lead to a more balanced and conservative use of grazing resources in the long-term at the expense of the small producers."

31. Since then there has been further pressure to sub-divide coming from within group ranches. The small producers is demanding equal land rights, according to historical rights of equal opportunity to make progress in the traditional system. Outside pressures have been to impose a compromise solution (Moses Olang 1982). Such sub-division should always consider the distribution of wet and dry season forage and drought refuge areas.

32. Within the group ranching system an alternative is available. That is to grant equal feed ownership rights to the traditional owners, when land is adjudicated and conditional leasehold is set with absolute stock numbers. Owners of larger stock numbers then need to sub-lease grazing rights from owners with small stock numbers. This allows traditional flexibility in successful stock management and movement within the pastoral (or nomadic) society, while providing the Government with a means of safeguarding the national asset. Traditional flexibility is demonstrated in table 5. The information is taken from Hadley (1984).

33. Land responsibility. That population pressures (human and stock) are exerting degradation pressures on the range resource cannot be denied. Some situations are more critical than others, eg. Turkana and Samburu areas. Extension services, socioanthropologists and local owners must work together in evolving sustainable social and technical systems which will not only maintain the existingsresource but reclaim it.

34. In some situations Government is opposing sub-division on the basis that such holdings would not be economically viable. If that is so neither is the group holding economically or ecologically viable. It is the same numbers of people and stock involved, with the same wet and dry season land resources and water supplies. The Government and community have to collectively deal with the problem in either situation.

35. The problem of land responsibility cannot be tackled without some form of feed ownership, (O'Brien 1984) which revolves around land ownership, either as individuals or specific groups with collective responsibility systems worked out amongst themselves; not imposed from outside ("ranch development" proposals). The adjudication of land rights can be conditional leasehold to either groups or individuals on ASAL areas, conditional on land responsibility. But the conditions must be sociologically as well as economically and ecologically sustainable. Lack of feed ownership destroys any individual attempt at land responsibility in commonly grazed systems.

36. Group owners should be free to enter into reciprocal agreements with other groups regarding traditional drought movements of stock. Such traditional rights should be respected and taken into consideration in the conditions of leases. Drought refuge should be part of the calculation of carrying capacity necessary to maintain or improve the condition of the lease area.

37. Individual ownership. A change from traditional pastoralism to mixed farming is part of the change process, at this stage minor. This will be accelerated by sub-division, in suitable soil-agroclimatic areas. In fact some individuals are using permanent residences and crop production to establish land rights within their group ranches, a de facto sub-division.

38. Another factor in the evolution of the pastoral areas is the increasing incidence of squatting on group ranches, state lands and national parks. Government is seen as reluctant to remove squatters, even on group adjudicated lands. The distribution of adjudicated lands is one way of protecting the rights of the traditional owners.

39. There is no point in trying to enforce the maintenance of historical pastoral areas as "ranch" areas, if they are environmentally suitable for developing mixed farming, but rather try to develop stable mixed farming systems. Mixed farming will sustain a higher population. But there is value in protecting the rights of traditional owners from encroachment by squatting.

40. The grazed areas in ASAL mixed farming zones have suffered from almost complete lack of extension interest. MOA soil conservation has stopped at the boundary of cultivated land. MLD range management has nominally stopped at the edge of the cultivated zones. The result is a severely degraded resource, basically common grazed. Some District Range Officers have turned their attention to the problem under District Focus interdisciplinary District development:

41. The International Council for Research in Agroforestry has done some very good pilot work on reclamation of such areas (Rockeleau 1983,1984). ICRAF has developed an approach to total catchment planning with a diagnosis and design methodology involving local people in several cycles of planning. ICRAF programmes apply to on-farm agro-forestry as well as common grazed and forest lands. Their concept is "trees-crops-livestock combined in space and time, and managed by people to produce cash or subsistence." Since landless people, townspeople, and part-time farmers often depend on public lands and/or other peoples land for subsistence or cash income, for those with limited access to land, water, other factors of production --- tenure rights and use rights are critical considerations.

42. Marketing and Banking. The ASAL livestock system is part of the market system although market offtake is only a proportion of subsistence offtake and will remain so. Nevertheless, the lack of adequate market development has been highlighted by IPAL studies, problems in "ranch" development, numerous Government (Livestock Marketing Division) and donor initiatives; and a variety of reports, studies and microprojects. The lack of market development; or more correctly, lack of market intelligence, market competition and market convenience; not only relate to the sale of animals (and ASAL farm products) but also the sale of domestic and production input supplies.

#### E. Water

43. Unless the Government is prepared to act responsibly on the question of control of stock numbers, it should withdraw completely from development of stock and domestic water supplies in ASAL areas. Development of water supplies should be as a response to the formation of user groups who are prepared to develop feed ownership-feed responsibility systems, prior to development of water supplies. There is little hope of developing responsibility afterwards. Such groups should be prepared to contribute financially to the development of water supply and accept full responsibility for its maintenance, as an acknowledgement of the social and economic benefits to be gained from such water: a financial and/or labour initial input with a balance of credit plus grant.

44. Water development should not be the result of a Government perceived need or a local political response to a government handout. Some existing water supplies are coming up for their third and fourth rehabilitation at government expense, because there has been no development of a responsibility system. There is money in the local communities to contribute to the things perceived as necessary, with technical help and credit.

45. During the credit financing of "ranch" development, water development was a credit service to the group ranches. Since the finish of the World Bank credits, the Government has reversed its policy and is now continuing development of range water supplies on a grant basis. This is ecologically and sociologically undesirable. It is necessary for there to be at least some contribution from the recipients; by all communities/user groups, including nomads.

46. The design of water supply systems must still take account of the need for separate wet season-dry season ranges to maintain ecological stability. Water supply in wet season range still needs to be short-term, while the capacity of the permanent water in dry season range needs to be restricted to the ability of the range to carry livestock. Bores need to be choked, lift systems in wells restricted. Water pollution is a common problem especially of pans. Fencing is desirable to control erosion of the pan banks, a major cause of silting of pans, and to prevent pollution by having to draw water. But it is destroyed without having prior responsibility amongst users and a financial investment to protect.

47. The spacing of water supplies has both domestic and range management considerations. In the purely range areas, range management must take precedence. An element of underutilisation is required in design, rather than allow over utilisation to develop. It is better in the long-term to have water droughts than feed droughts.

48. In nomadic areas a spacing which allows large stock to water every second day with a grazing radius of ten kilometres permits reasonably even grazing, and improved resource utilization. With camping points at five kilometres from water, small stock and domestic needs are adequately catered for, especially with carrying water by camel or donkey. There is a trade-off in rate of growth, as stock watering every second day consume at least thirty percent less forage and may only spend one-sixth of their time grazing when using the distant points. MOWD proposals are for water within five kilometres of every household. For nomadic areas this means an effective spacing of twenty kilometres.

49. In pastoral areas a greater density of water points allowing daily watering of large stocks can be more economically justified, a spacing between watering points of ten kilometres. Dwellings/camps were always away from water because of predators. This allows the potential for greater per head production but also increases the responsibility in balancing water supplies and stocking rates to range capacity. A balance of ephemeral and permanent water is still required.

50. In farming areas MOWD proposals are for watering points within three kilometres of every household. This increases the need for feed ownership-feed responsibility and elimination of uncontrolled common grazing.

#### F. Ranching

51. Before independence, ranching was principally concerned with the highlands and midlands, for beef production and to a lesser extent wool and fat lamb production. These ranches were not confined to ASAL areas. Range development came under the District Agricultural Officer. Formed on this basis and subsequently heavily influenced by advisors from and training in USA beef-oriented rangelands; there has been a sustained bias on research and extension in range management towards commercial ranching beef production systems and grass production to sustain them. There has yet to be real recognition that the indigenous, mixed livestock, milk-meat, grass-browse, savanna production systems are the natural production systems for ASAL Kenya; by the Government of Kenya (and the Agricultural Finance Corporation). Efforts are not directed at improving the productivity and off-take of the indigenous systems, rather replacing them with commercial meat animals and commercial production systems.

52. In the early 40s attention was drawn to the deteriorating range resource. Isolated grazing schemes and district improvement schemes resulted in the African Land Development (ALDEV) 1946-55 ten year plan: with enforced programmes of rotational grazing, fencing, water development, marketing of livestock to destock, irrigation to resettle excess population, and tsetse eradication. There was no demonstration of the value of these measures, a lack of communication and little understanding of why. These developments collapsed in the early 60s.

53. Since independence the UNDP/FAO Range Management Project was initiated in 1966 to assist the new Range Management Division. This was followed by Phase I of the Livestock Development Project 1968-74. Phase II Livestock Development Project was initiated 1974-80 (extended to 1982, some allocated funds spent 1984), as a rapid expansion of Phase I because Phase I was apparently so promising.

54. Phase I, \$11.4M, had a major objective of increasing beef production by providing credit for four different types of ranching enterprises; group, individual, cooperative or company, commercial; providing facilities and services for livestock marketing, range water development and disease control. Credit was provided to assist the transition from subsistence to market economy. The project was considered a success: with 108 ranches developed compared to 60 projected, with a target of 50,000 market animals achieved, 0.9 m ha of grazing blocks developed in NE Province, stock routes and quarantine holding facilities extended.

55. Phase II, 859.7 m proposed, similar objectives to Phase I, increased beef production, improved range infrastructure, plus wildlife development. Phase II was beyond the staffing capacity of GOK and AFC to implement. Major restrictions were lack of capacity in ranch planning and water development, plus the necessary caution in land adjudication. At the end of the project these achievements were claimed: 27 out of 60 group ranches formed, 19 out of 21 large company ranches in new areas (Coast Province), 55 out of 100 commercial ranches in traditional ranch areas, development of 303 individual ranches and 485 small ranches, a further 8 out of 13 grazing blocks in NE Province and two out of four in Isiolo. A lot of these developments are listed on paper but the reality of their functioning as designed is quite different.

56. The GOK later summarized the project problems and constraints: harsh environment ill-equipped with infrastructure, delays in disbursement, recurrence of droughts (a ten year drought in 1978-79, a major drought in 82-84), epidemic diseases and presence of tsetse, insufficient supply of immature cattle (worse since LMD stopped buying), inadequate trained staff to manage ranches (insufficient training of group or individual owners), ineffective grazing management committees in grazing blocks (ineffective management committees on many ranches), unsatisfactory price structure and market system (a lot of overcapitalisation and costly management overheads), slow pace of land adjudication-provision of leases - title deeds and registration of ranches/ranch plans (partly necessary), inadequate livestock credit, too many agencies involved, lack of water development capacity, inappropriate machinery supply, inadequate security (cattle raids and secession), inadequate contributions by cooperative/company shareholders, tendency to subdivide, lack of control over livestock numbers and movement (colluded with by AFC to add fattening stock for repayments), lack of involvement of the local people in the planning and implementation of the projects (ranch/block development), development of water without proper control of its use resulting in overutilisation (still proceeding), inadequate logistic support to facilitate extension personnel implementing projects effectively (even worse now with lack of follow-up resources), project design too ambitious; socioeconomic problems, lack of cooperation of beneficiaries to contribute towards maintenance of developed infrastructure, resistance to new technology, majority of people illiterate (but not unintelligent!) (resistance to repayment of debt, particularly on a livestock count basis); water development expensive, overexploitation around permanent water, other areas underutilised, lack of development funds to continue to initiate new projects; lack of maintenance of livestock infrastructure, water-dips-access roads-firebreaks.

57. It is worth adding further comment. The livestock development project was totally unrealistic in its expectations of extent and speed of change in livestock and management, without adequate prior demonstration of the value of change. Livestock people are essentially more conservative than cropping producers, and ASAL producers need to be more conservative than others. They have to not only perceive the need for change but have to see the proposed change through at least one drought cycle before widely accepting it as appropriate technology. The changes the GOK sees as desirable still have not been demonstrated to have survived a drought cycle and be economic. de Leeuw et al (1984), comparing the financial productivity of traditional pastoralism with a commercial ranch in comparable country, came up with a gross income of Ksh 176/-ha for an expenditure of Ksh 12.4/-ha in the traditional pastoralism, and, gross income of Ksh 178/-ha for an expenditure of Ksh 143/-ha in the commercial ranch. The proportions of gross income in pastoralism were, actual sales Ksh 42/-, unsold inventory change Ksh 79/-, subsistence milk Ksh 47/- and subsistence slaughter Ksh 8/-. The commercial ranch was using improved Boran cattle and the traditional pastoralism EA Zebu. The additional production from the sheep and goats was not calculated for the traditional pastoralism.

58. The ten year repayment period for major capitalisation in ASAL areas was again unrealistic. There were no drought pauses in repayment, an elementary procedure for ASAL areas. The repayment period has been rescheduled to 20-25 years by GOK but there are still no drought pause clauses (during the later part of a drought and for a year after). The design of company-cooperative ranches in new areas was overcapitalised and had too much management overhead. They were allowed to proceed with lack of equity input from the members. (There has been lack of prosecution for known missappropriation.) Many are bankrupt yet the GOK/AFC proposes to refinance them rather than sell the companies and start new companies with adequate equity.

59. There is an informed body of opinion that most group ranches, individual ranches and small ranches got involved with the project solely to gain title to their land, not because they wanted to get involved in commercial beef production (Sandford 1982). In many group ranches and commercial ranch operations it is a lack of working capital and lack of supply of cattle for finishing that is causing repayment problems, rather than lack of equity: given there is sufficient spare carrying capacity. Consideration should be given to stock mortgages or other working capital arrangements. Lack of supply of animals for finishing is a result of the major drought deaths, and quarantine problems, but also inadequate filling of the market gap by private enterprise with the withdrawal of LMD. There is lack of coordination between ranch requirements, traders and suppliers in the drier areas.

60. The lack of involvement of the local people in planning of the ranch projects, particularly group ranches (but also individual and small ranches) now reflects in the failure of many ranch management committees to represent the members of the group. The Range Management Division-AFC policy development was paternalistic in application and isolated from the sociological development needs of the groups and individuals. The practise is different from the theory (Moses Olang 1982). Some ranch management committees have been a focus for rapid social change, despite the AFC.

61. Grazing committees, such as still exist in the grazing blocks, do not represent all the traditional users of the resource. They are composed of townspeople because it is easier administratively. Whilst the administrative and political representatives of the people may be townspeople they do not represent the non townspeople when it comes to control of grazing resources. Until the total population of traditional users is fully aware and directly represented there will be no development of feed responsibility and no stability following water development. It is a difficult but not impossible task. (In Marsabit, IPAL used saddle camels to communicate with nomadic people).

62. There have been some discrepancies between the theory of land adjudication and reality; eg. with "rectangular" ranches for "clan" boundaries in Baringo District; Phase I boundaries not always fairly adjudicated. With adjudication of group boundaries on a level below the clan, an informal group level, there were cases of uneven distribution between groups, with more people electing to go in one group for any number of reasons. Adjudication is an opportunity to support the development of land responsibility and this should be exploited.

63. The World Bank Audit Report, 1985, summarised the results of Phase II "Many ranches were owned by groups of people but there was considerable dissention within these groups, decision making was ineffective and many owners are now subdividing their land. Some new ranches were established with insufficient equity capital, while management was often indifferent and extension services were weak. Livestock prices declined in real terms over the project period and this adversely affected financial viability of ranches. Government did not phase out price controls for beef. Under the component for development of range water supplies and improvement of grazing, a considerable amount of physical development was carried out. But subsequent maintenance has been poor and control of grazing has been ineffective. A significant amount of physical development was completed for livestock marketing component. There have been few sustained benefits from this project."



64. Development of ranches will diversify. Group ranches that don't subdivide will continue with traditional production systems, slowly intensifying animal selection and range techniques, probably including some fattening off-take from outer areas where development increases carrying capacity. Individual "ranches" of small size will intensify production more rapidly (possibly including pasture improvement in zones V-5, IV-4, IV-5 and highland areas) or convert to mixed farming. Larger individual and commercial ranches will concentrate on grade beef herd development, supplemented by fattening. Cooperative and company ranches having continued financial problems will be forced to reconstitute. The group ranches and small individual holdings come within IFAD target groups, as well as producers in the arid areas grazing blocks and other unadjudicated lands. Some company, cooperative and commercial ranches are composed of smallholders who would be IFAD target producers.

65. The complexity of ranch development makes any simple statement inappropriate. Within any one segment there are financially sound and financially unsound developments. There are also financially sound sectional development activities within otherwise top heavy development plans. The whole question of financing the livestock development programme of RMD/AFC deserves attention but requires detailed examination as to what parts of the programme are financially rewarding and/or what alteration should be made to RMD/AFC management conditions and ranch planning.

66. The current RMD/AFC programme deals with adjudicated lands and lease allocations. The water development programme of RWD extends into grazing blocks managed by RMD. Since Phase II Livestock Development Project water development of group/coop/company ranches (multiple users S&D water) is proceeding on a grant basis out of MOWD funding. MOWD funding of water development is proceeding nationwide. Through District Focus and RDF water development is not restricted to adjudicated areas or grazing blocks. RMD extension should also cover all range areas.

67. Other aspects of livestock development such as livestock improvement and range reclamation, require action without waiting for land adjudication; but like water development, restrictions of land responsibility and financial contributions should still apply to these developments, if they are to be in the national and personal interest and self-sustaining. Land responsibility revolves around feed ownership.

#### G. Livestock Marketing

68. Stock routes and quarantine holding areas existed in the pre-independence era. During the livestock development projects the facilities of the stock routes and quarantine holding areas were greatly upgraded by LMD. Thirty-five buying centres were developed throughout the pastoral and nomadic areas and equipped with crushes and weigh bridges for liveweight selling and veterinary work. Some of these facilities need to be relocated to areas more under control of County Councils now that LMD is not operating as a buyer.

69. Holding grounds were developed near most of these buying centres, to allow livestock owners to bring stock from distant points to more centralised selling. This provides some additional competition to the traditional producer/trader who bought from smallholders and traded with the bigger traders at collection centres. Most of the holding grounds double as vaccination centres for livestock bought at the selling centres. Water and

outspan (rest) centres were built along the stock routes, with dams or boreholes, staff housing and guards. Some of these facilities receive little use since LMD stopped buying, they receive little maintenance and are not operated on an economic basis. Local producers use the facilities so that feed supplies do not build-up as drought reserves for travelling stock. Some bush clearing has been done on some rest areas and carrying capacity could be increased by bush thinning on others. Tsetse is a problem in some areas. Some of these areas have dipping facilities or spray races for travelling stock, also used by locals. Some of the holding grounds and rest centres are being used by the Government for other purposes, including sheep and goat multiplication/adaptation centres.

70. There are a number of major quarantine holding grounds, some are in the process of having their facilities expanded. Many of these grounds receive excessive use because of the extended periods non slaughter cattle are held for CBPP testing. It would be desirable if the test could be reduced to two clear tests at a month's interval (or less), and/or additional areas be purchased for quarantine use, and/or money be expended in reclaiming the productivity with earth works for water harvesting and sowing pasture/browse. Much of the destruction occurred when LMD was forced to buy excess numbers during the droughts. RMD personnel should use these areas as demonstrations of range reclamation/management techniques.

71. Fees are collected from traders using the facilities and from locals who use them for agistment purposes. Producers who bring stock for market are allowed to use the facilities for free, and, often use them for growing-on and fattening purposes in the guise of waiting for good prices. There is a need for these facilities as travelling stock and market reserves. They should not be abused by local use or growing-on, if the marketing of live animals between the outer pastoral and nomadic areas to the inner pastoral and ranching areas is to be encouraged.

72. More market intelligence and the organization of special sales to facilitate trade in animals for grass finishing (rather than just immatures for growing-on) are needed to make better use of facilities and encourage more off-take from the outer areas. Special sales allow coordination of demand for finishing animals, at commencement of rain periods, with the time requirements to travel stock and clear quarantine. Special sales also induce more buyers/traders thus providing the element of competition. Aspects of livestock marketing and movement facilities are being addressed in the FAO/African Development Bank Sheep and Goat development project (Map 4).

73. The old system of LMD buying stock for AFC to supply to ranches and then forced sales through KMC was a direct subsidy to KMC and the urban meat market. LMD bought at low prices and subsidised the transfer of stock to AFC and the ranches. KMC bought at below market prices. This was a one way process. Nothing was put back into the communities where the LMD bought. There was no market development of input or commodity supplies by the project. That sort of intervention is to be avoided and encouragement of market development in both directions replace it.

74. Prices. The World Bank has been very critical of meat pricing policies in Kenya and their differential effect on the economic status of different ethnic groups in the Kenyan community. The relative decline in controlled meat prices and hence the livestock prices paid to producers, compared to inflation and cost input prices, during the Phase I and II livestock development projects (and since) was considered a significant point in the failure of these projects to make a lasting impact on integration of the livestock industry or the commercialisation of herd structure. The off-take from the projects was very variable, depending on

seasonal conditions, supply of immatures (price affected), availability of working capital and dominantly meat prices: apart from drought effects.

75. Control of retail prices for meat greatly influences the interest of subsistence producers in trading; what they lose or gain by trading in way of domestic advantage. The high support of maize prices and relative depression of livestock prices was counterproductive in trying to integrate subsistence pastoralists and nomads into the economy. From 1981 to 1983 meat prices improved considerably, some special cuts even rising greater than the rate of inflation (tables 9 and 10). These improvements didn't move far down the chain towards the producers. Figures were not available since 1983 but market quotes by field officers indicate little change since 1983. The 1983 sheep and goat retail price of 21.6/-/kg gave a return to growers of 12.25/-/kg liveweight from KMC. Return to growers for beef from KMC in 1983 were: premium grade 15.50/-/kg, high grade 14.50/-, standard 11/-, commercial 8/-. The KMC price to producers for premium had only risen to 17.50/- in 1986. Trade prices are 2-3/- above this.

76. Prices paid for livestock vary within the year on supply and demand. The beginning of the school year is a peak supply period with consequent low prices. This reflects both the lack of market intelligence on supply-demand patterns and lack of access to savings bank accounts to husband sale money. Some "comparative" figures from Kitui and Garissa from LMD/RMD reports gives an idea of price differential and price ranges: Kitui goats 250/-, cattle 850-2500/-, ranch purchases 1500/-, ranch fattened 3000/-. Garissa goats 100-450/-, cattle 750-2250/-, camel 2280/-. Traders are currently selling immature cattle at Mombasa at 8/- per kg liveweight and probably paying about 5/-/kg in the NE. There is a growing trade in live animal export, especially sheep and goats. There is interest in camel export, while cattle numbers appear to be retreating.

#### H. Distribution of Livestock

77. Livestock estimates: Livestock estimates may vary considerably from year to year due to variable death rates from drought, movements between districts in drought and variable slaughter rates as a result of drought or good season off-take, variable slaughter rates due to market response to price-cost differentials. The last census in 1978 was incomplete because of various factors. There are a number of apparent inconsistencies between reports which make detailed examination of trends illegitimate, but the general distribution of livestock in ASAL districts (old system classification) is given in table 6, for the years 1983 and 1985. These figures show the comparison of ASAL district livestock populations to be, zebu cattle a little over 60%, sheep 70-80% and goats 80-90%.

78. Drought. Table 6 compares the distribution before and after the 1983-84 drought. The districts with the most dramatic decreases in stock populations are Turkana, Samburu, Kajiado, Laikipia (sheep), E/Marakwet (sheep and goats); Marsabit, Isiolo (cattle), Machakos; Tana River (cattle). The figures for NE Province may have an explanation but seem highly suspect. Tables 7 and 8 give a detailed study of the effect of drought on the Kajiado District. This detailed study shows considerably greater drought deaths than the LDD figures, cattle 70%, sheep 49%, goats 37%. There is of course very considerable economic loss. The local figures from Kitui also suggest more severe losses than the LDD estimates.

79. The sheep and goat project proposal (FAO/ADB) quotes population figures for sheep and goats before and after a series of droughts since 1975. They show differential effects of drought and rate of flock replenishment: droughts 1974/75, 1979/80, and 1983/84; sheep '75-6.0 m, '78-6.6 m, '81-5.6m, '83-6.6 m, '85-7.5 m; goats '75-6.0 m, '78-8.5 m, '81-7.0 m, '83-7.8 m, '85-7.9 m. Goats have a higher rate of recovery and are less susceptible to drought death than sheep which are generally better than cattle, if browse is available. Drought appears to be the overriding factor of population changes in ASAL areas.

### I. Carrying Capacity

80. Carrying Capacity: Braun et al (1982) using results from many previous studies, have estimated the potential carrying capacity of different agro-climatic zones; based on grass production potential, not grass-browse (table 9). This has been discounted by a percentage consumption factor to obtain practical potential stocking rates, based on a stock unit of 300 kg. Thiongo (1986) using estimates from Jatzold quotes a very different carrying capacity for the same zones (table 10), based on a livestock unit of 450 kg. Even allowing for a 50% difference in the units, this still represents a considerable difference in carrying capacity estimates. Reduced to a common stock unit of 300 kg, Braun estimates 0.5-1.0 ha/SU and Jatzold 2.6 ha/SU for zone IV, an incredible difference: Braun 1.0-40 ha/SU and Jatzold 6.6 ha/SU for zone V, for Zone VI the difference is less Braun 4-20 ha and Jatzold 13 ha/SU, while for zone VII Braun gives >20 ha/SU and Jatzold 26 ha/SU. Jatzold estimates are also based on grass production, discounted for competition by browse.

81. The perception of overstocking is obviously influenced by any estimate of carrying capacity used. The livestock carrying capacity of savanna which contains browse and mixed classes of livestock is greater than that of grassland grazed by cattle. The human carrying capacity is related to the amount of grain which is substituted for milk in the diet, ranging from zero grain to zero milk. The comparisons of Thiongo in his paper, between actual and potential human carrying capacity in marginal ASAL fails to clarify this point.

82. Farm Management Handbook: The following details were extracted from the Farm Management Handbook. The limitations of this data must be recognised: the differences in carrying capacity estimates between Braun et al and Jatzold have already be discussed: the Agricultural Land Statistics 1979 census deals with land areas of "farms" as numbers of household divided into location area, not cropped land plus common grazed areas; the difference between upper quartile and lower quartile resources is very large: the Small Farm Survey 1971 only had 1620 farms for the whole country so the sample in ASAL Districts is low, it only went down to zone IV, all participants were members of cooperatives so were in the cash crop economy not typical of zone V-VI marginal farmers: The Large Farm Survey 1979 data is not included (available Laikipia/Nakuru). The level of subdivision of the agro-ecological zones, done by districts, is more intense than the agro-climatic zones used in the rest of this annex: the length of growing season is especially important for cropping potential, but also affects carrying capacity. At this level differences between Jatzold/Braun/World Bank zones may be significant.

## II. EXISTING SUPPORT SERVICES FOR ASAL RANGE AND LIVESTOCK DEVELOPMENT

### A. Research

83. The Kenya Agricultural Research Institute (KARI) is being developed as a parastatal organization charged with the responsibility of overseeing the development of research and research standards, formulating programmes of research and coordinating research between different sectors. There will be National Research Stations responsible for different crops, livestock and range.

84. Range research will be the responsibility of the National Range Research Station at Kiboko (lower midlands zone V-2). The former Range Research Station at Buchuma (lowlands zone VI-1) is now an outstation of Kiboko. Other government research stations are also occasionally used as outstations. The Kiboko programme does not cover the environmental variation in major vegetation types or major ASAL climatic zones, much less combinations of these. It is concentrated on grassland in southern Kenya. The IPAL research programme from Marsabit (zones VI/VII) now becomes Kenya Arid Rangelands Research Station. Presumably its programme will become coordinated with Kiboko to cover more of the ASAL environments in a truly national programme.

85. There is a component of pasture and fodder crop and animal production at the National Drylands Farming Research Station, Katumani (zone IV), aimed at smallholder agricultural systems. Presumably the proposed cropping systems research programme will also cover soil management pasture-forage phases in crop rotations.

86. Development of browse, and drought reserve fodder trees, is not adequately covered in any national research programme. The FAO project, 'Collection and Evaluation of Plants for Animal Production', Kitale, and its successors, have done some sporadic work at Kiboko and Buchuma, and, the International Centre for Research on Agroforestry have done observation plantings.

87. Pasture research is conducted at and from Kitale, for high production areas, and through the above FAO Programme on a "National" basis. Although not covering arid areas (reclamation requirements) or fully covering semi-arid areas either (reclamation, range improvement and range replacement requirements). There are useful results for ASAL and there could be more with correct emphasis.

88. Livestock development programmes are concentrated on the National Animal Husbandry Research Station at Naivasha (lower highlands zone V-5) and the Beef Industry Development Research Station at Lanet (lower highlands zone IV/V). Further work is conducted at Alupe Animal Research Station and minor stations.

89. The livestock development programmes started at Buchuma (lowlands zone VI-1) have been transferred to Naivasha. Some comparisons of improved indigenous breeds, Boran and Galla, with improved exotic breeds are planned at Kiboko. Various livestock improvement centres and minor research stations have a subsidiary function in breed multiplication, especially of sheep and goats. There appears to be no programme on the improvement of the remaining

indigenous breeds. The sheep and goat improvement programme at Tharaka (Meru) is a major donor programme on Galla goats. A camel research station has been initiated at Grift (Wajir) but lacks staff.

90. International Institutions:

- ILCA run a country research programme in Kenya, covering a range of topics in livestock development; production, sociology, economics, etc..
- IPAL are handing over to KARRS.
- IABAR, International African Bureau on Animal Research is also represented in Kenya.
- ICIPE, the International Centre for Insect Physiology and Ecology is carrying out research on tsetse and tick physiology and related diseases.
- ILRAD, the International Laboratory for Research on Animal Diseases is working on trypanosomiasis and eastcoast fever.
- The Wellcome Institute is conducting research on foot-and-mouth disease.
- The National Veterinary Laboratories at Kabete is doing a range of veterinary research and investigations.
- The ODA/KVRD project is also involved in research and investigations.

91. There is scope for considerable improvement in the interaction with and transfer of information between various segments of the research chain: from international research right down to the district level applied research and development of demonstrations, both long-term and short-term. The object of the research, to facilitate social change, is too often forgotten along with communication.

B. Livestock Development

92. Livestock Development Division shares responsibility for livestock development with the Range Management Division. The functions of the Livestock Development Division effectively cover the high and medium potential mixed farming and highlands ranching zones; including the dairy industry, wool industry, grade beef industry, pig industry, poultry industry, rabbit industry, bees, dairy goats and meat goats. Sheep and goat multiplication centres (see table below) concentrate on meat production improvement. Dual purpose milk-meat animals, including camels, now receive more attention in planning (National Livestock Development Policy 1980), but little in practise.

<sup>a/</sup>  
Multiplication Centres - Sheep and Goats for ASAL

Location	Breeds	Flock 1983	off-take	Sales 1983 <sup>b/</sup>	1986 (LDD estimate)
Naivasha- Nakuru	Dorper Merino	3500	<5%	160	300 100
Kitengala- Kajiado	Dorper Red Masai	750 350	<9%	90	
Matuga- Kwale	Black Head Persian Galla	500	<5%	25	
Buchuma- Taita	Black Head Persian Galla	100 400	<5%	25	80
(Kiboko stn- Machakos)	Galla				Surplus to research
Kimose- Baringo	Galla	500	<4%	15	50
ADC Matura	Red Masai	5000			
Tharaka- Meru	Galla				200
Kitui	Galla x Boer				

<sup>a/</sup> Sheep and goat project plans were for 1500 sales target by 1975

<sup>b/</sup> High mortality of all stock and sales restricted, because veterinary supplies cut to income producing project under budgetary restrictions.

93. There is a need for animal production extension expertise to be effectively applied in all livestock industries in all ASAL areas. Pastures are "covered" by Livestock Development, but at least in midland and lowland ASAL areas it is a neglected area which may be better handled by Range Management Division personnel. LDD staff are only represented down to Divisional level, beyond this were Agriculture staff with livestock extension responsibilities.

LDD Staff Distribution 1983 report (latest figures available)

Province	AOs	TOs	TAs	%	in ASAL
Western	6	16	38	Not	ASAL
Nyanza	6	24	54	"	"
Rift Valley	24	40	122	Half	"
Central	12	15	60	Not	"
Nairobi	2	3	6	"	"
Eastern	12	19	45	Mostly	"
Coast	7	18	22	"	"
Northeastern	1	3	14	All	"
	70	138	415		
Nairobi HQ	13	4	6		
Sheep and Goats Project	7	14	28		
Beekeeping Stn.	3	18	8		
Livestock Recording	4	5	12		
	97	179	469		

94. Range Management Division is responsible for range management in the non-agricultural areas of Kenya. In ASAL Districts it operates in the mixed farming areas as well, although nominally its responsibility stops where cultivation starts. Range management activities include supervision of group ranching, commercial ranching, grazing blocks development and field extension. Some personnel have also been assigned to ranch management.

95. Most extension is in pastoral and nomadic areas. Duties include advice on range rehabilitation and improvement techniques, such as reseeding, bush clearing, soil erosion control, grazing management; proper stocking rates on ranches and occasional census of livestock. Other aspects of livestock development are "covered" by RMD where LDD is not present or poorly represented, such as at the location/sub-location level. There are 63 professional officers, 238 technical officers and 425 technical assistants in RMD (see table below). The distribution by districts was not available. There are professional technical range staff employed in other divisions of MALD (MLD) in research, training: plus others in Universities, other Ministries/Departments, parastatals, eg. AFC, and private organizations; trained by RMD. Applied research and demonstrations occupy approximately 10% of staff time at location and ranch level. Greater attention should be given to general extension outside the development of grazing blocks and ranches.



RMD Staff Distribution 1986

Cadre of personnel and Education/Training Level	HQTS	Province	District	Division
<u>Professional Officers</u>				
MSc. Range Science	1	-	-	-
MSc. Agric. Extension	-	2	-	-
MSc. Agric. Economics	1	-	-	-
BSc. Range Science	4	2	51	-
<u>Technical Officers</u>				
Dip. Range Management	1	1	8	179
Dip. Ranch Management	-	-	56	-
<u>Technical Assistant</u>				
Certificate: Range Management	-	-	-	425

96. Livestock Marketing Division is responsible for the network of holding grounds, outspan centres and stock routes supporting the marketing and trekking of livestock. There are some selling centres which are neither operated by Country Councils nor LMD. Under the possible African Development Bank sheep and goat project LMD will be responsible for developing an auction system network to tie in with existing auction centres (functioning and non-functioning!), and other marketing outlets. LMD provides a limited amount of marketing intelligence and is interested in an opportunity to expand this function.

C. Veterinary Services

97. The Veterinary Services of MLD comprise fieldwork, clinical services, quarantine, vaccine production, research, tsetse control, dairy hygiene. The work of the Veterinary Services is heavily orientated towards the improved breeds and protection of the highlands cattle industry in particular. Disease control of non-improved indigenous cattle and their effect on economic productivity is a secondary consideration. Diseases of sheep and goats and their effect on economic productivity receive emphasis in planning but get little attention in the IFAD/World Bank Animal Health Services Rehabilitation Programme. Camel disease investigation is planned but little practical extension of existing knowledge is being implemented.

98. The great weakness of veterinary services in ASAL areas is their lack of practical recognition of the importance of production from non-improved indigenous stock, and of the effect diseases have on their production and potential off-take, even in arid and semi-arid environments. Extension of animal health care procedures to producers and an ensured supply of drugs could help to increase livestock production in the ASAL areas.

D. Water

99. Water development services to ASAL livestock producers are dealt with in Annex 7. The Soil and Water Conservation Branch is involved in small "on-farm" development of water supplies. The Agricultural Machinery Service (formerly Soil Conservation Branch) does contracting for private water development. Small-scale public water development is also done by Soil and Water Conservation Branch. Larger-scale stock and domestic water development is done by MOWD - Range Water Division.

E. General

100. The quality of staff at the District level and Divisional level is good, but its effectiveness is restricted by (1) lack of mobility, (2) lack of demonstrations, (3) lack of perceived opportunity to be innovative, (4) unadapted objectives, (5) programmes set from above with little account taken of the wide range in combinations of circumstances within and between Districts. Under District Focus and District Development Committees the opportunity exists for a great deal of innovation, if it is encouraged from above and finances for demonstrations and mobility are forthcoming. Extension is about perceptions: raising local consciousness of the real problems and opportunities by demonstration, while catering to the locally perceived needs. There is of course danger in ASAL areas of catering to locally perceived needs, without also addressing the causes of problems. The perceived needs of the locals (livestock development) are, water, water, water, veterinary services. The local technicians' perception at needs is heavily influenced by government policy: (1) Range; water, veterinary health, range improvement, livestock - replace EA zebu - replace EA goat - more camels in nomadic areas: (2) Farming zone; water, veterinary health, (a) shifting agriculture - range management, (b) mixed farming - erosion control of grazed areas, livestock replacement with Boran and Galla.

101. It is as necessary to raise the perceptions of staff by ongoing professional development, as it is to raise the perceptions of the local people. Increasing perceptions of technical staff could often be better served by outside work experience in other savanna areas, in developing and developed countries, than by bringing in long-term experts. But they then must analyse that experience in terms of use in Kenya and not only report to their seniors (as now) but report to all staff. Ongoing professional development, by way of exchange of ideas/experience between staff in conferences and workshops is very limited because of lack of resources, but is of extreme importance in developing innovation. Donors and Government should be encouraged to consider these as alternatives to formal study programmes. More encouragement needs to be given research-extension-education liaison in mutual development of local technology and self-sufficiency.

### III. TECHNICAL POSSIBILITIES

#### A. Range Management

102. Considerable basic and applied research has gone into describing the savannah ecosystems of the world, those of East Africa, and of Kenya in particular. There is sufficient basic understanding of the ecosystems to systematically look at the management options for particular vegetation ecosystems. These management options must take account of the needs for off-take of milk and meat within the production system, before commercial off-take. They must take account of the need for diversity of animal types to utilise different strata of available feed. Sheep, goats, cattle, camel; (possibly domesticating eland or wildebeest (etc.) for the future) and wildlife.

103. The current emphasis on specialised cattle production for urban beef (and milk) requirements must be put back into context with the existing production systems and their natural progression. Because drought survival is the overriding motivation of livestock owners in ASAL areas, changes in existing indigenous systems must be perceived to and seen to withstand the challenge of drought. Past attempts at developing ranching and grazing blocks did not stand the challenge of drought; apart from the many sociological problems in their design and imposed management (and the rate of capitalisation and high management expenses).

104. Sufficient expertise exists in Kenya to design indigenous range management systems for each particular vegetation association, by agroclimatic sub-zones, soil associations and patterns of land use. Management for maintenance and improvement should include considerations of fire and grass-shrub balance, and in bushland the balance between livestock and soil requirements in the bush fallow rotation. Reclamation technology should be reviewed along with pasture replacement in higher rainfall and farming areas. The expertise is available in the Range Management Division (both at national and district level), the National Range Research Station, Kenya Arid Rangelands Research Station, ILCA and IPAL teams (some recently dispersed members may be brought back on short consultancies), the Universities and College staffs, the forage research programme at Kitale, KREMU, sectors of LDD associated with marginal areas and donor project staff.

105. Long-term demonstrations of range management systems need to be established in each division (preferably location), for the different ecosystems present in each district. These need to be worked out with the local people and implemented by beneficiaries/beneficiary groups, with assistance from Ministry sources: by individuals or groups. They should be responsible for policing it themselves.

106. Emphasis needs to be placed on vegetation balance between grass and browse and drought fodder trees, and, finding correct stocking rates. It is better to be a little heavy with estimates of stocking rates than be too light, if acceptance is to be achieved. There can be no guarantee that the stocking rate chosen is the optimum: (see differences Braun and Jatzold). There is no need to make drastic changes to grazing systems. Drastic changes to the balance of grass/browse may need to be demonstrated in some areas, using traditional methods of cutting and burning: especially in developing ranches from "unoccupied lands". Financial guarantees may initially be involved as a guard against loss of production, while faith in the

demonstration develops. It is essential that the management system used can be implemented by the beneficiaries and readily adopted over the whole ecosystem.

107. Droughts are the most economically limiting factor in livestock development in Kenya. A major effort is required to improve the drought proofing of Kenya rangelands and other ASAL areas: by developing and improving drought refuges. In some traditional pastoral systems there have been traditional drought refuge areas. The system is breaking down with population increase, permanent use of dry season areas and the extension of National Parks. Alternative systems must be developed. These may be refuge areas and/or they may be refuge fodder trees within grazed areas or around manyatta, water holes, etc: which can be lopped or provide large quantities of pods. Shrubs such as salt bush, which are normally not eaten but are eaten in drought, make good drought reserves; but they are very susceptible to damage by large stock.

108. Multi-story forage production offers the best scope for drought reserves under today's population pressures. A lot of fodder trees can accumulate several years growth as a standing crop. The traditional respect for trees within most grazing societies offers hope for finding opportunities which beneficiary groups will develop themselves: as groups or as individuals. There are a range of trees/tall shrubs already recommended by different organizations for different agroclimatic/soils situations. Numerous others from the native flora are yet to be "developed". Many of these will have different requirements for germination in the field than for growth, once established in nurseries. Simple water harvesting techniques offer considerable advantages for enhancing establishment and growth.

#### B. Range Reclamation

109. Serious Degradation. Degradation of rangeland is a major problem in Turkana and Samburu ethnic areas: and some other areas. Destocking for range regeneration is not a politically desirable option. But increasing feed supplies to develop a defacto destocking, together with control of stock numbers, is politically acceptable. Reclamation of a proportion of range (the worst) is one way of relieving pressure on other areas, to assist regeneration: providing responsibility in management is developed and livestock increases regulated by the users (with guidance).

110. Range reclamation techniques were demonstrated in the Chemerone grass seeding and bush slashing trials, South Baringo (1965-72), but little is being done to implement these results. The result has recently been demonstrated again in Eastern Kitui and further reseeding done in Baringo.- The species most successful in these trials were Enteropogon machrostachyus, Cenchrus ciliaris and Chloris roxburgiana. Eragrostis superba has also been identified as a species suitable for use in some semi-arid conditions. It has recently been used in Eastern Kitui, along with Cenchrus ciliaris. Seed of selected strains of these species is available from the national collection at the National Agricultural Research Station, Kitale. Other species or strains will be required in more arid areas. These may be available from Kitale or may initially have to be collected from the protection of shrubs or thickets for seed build up.

111. The essential point in reclamation is to allow undisturbed growth during the growing season and to allow seed drop before dry season grazing is commenced. Survival and subsequent production is increased if grazing leaves some stubble (approximately 30% of growth is desirable to create the micro-environment to protect the plant base). There is no need to close up areas during reclamation, just destock in the growing period. Restriction on growing season grazing should be applied until moderate cover is achieved when normal indigenous rotations can apply. Availability of grass for thatch is an important subsidiary effect of range reclamation procedures.

112. Work on numerous similar environments has clearly demonstrated the value of simple water harvesting techniques on accelerating reclamation and increasing production, including work in Baringo. Simple easily constructed water harvesting techniques suitable for local camel or oxen draught power include staggered furrows (small contour furrow/banks 1-200 metres long with turned up ends) and range pitting.

113. Seed multiplication should be organized locally to save on capital outlay; on staggered furrow "crop area" close to houses. The whole exercise must be undertaken by the beneficiaries/beneficiary group with a clearly defined set of steps, objectives and rewards. Feed ownership-feed responsibility must be one of those steps. (In any individual distribution of feed ownership, wet and dry season range and drought refuge or other traditional rotation must be considered.) Reclamation should be tied into other development aspects such as land ownership and water development, as precondition and as reward.

114. Sacrifice areas around towns and permanent water supplies represent between 10-25% of rangeland. In these areas production is gradually or rapidly progressing to extremely low levels. This represents a significant loss of production. The loss of production is serious from a national point of view but more serious is the degradation of the soil resource through erosion; and, the focus effect these points of degradation have in reducing production in surrounding areas, by increasing the effective aridity of the environment. The sociological problems of control of sacrifice areas are greater than those of control of seriously degraded rangeland, because the balance of productivity and condition in the remaining 75-90% may be quite good.

115. Around towns the sociological problem is accentuated by grazing of small stock by people who do not have the time to move them long distances. The common grazing problem is accentuated with little hope of getting common management. An approach to management of these areas may be a conditional land allocation to individuals, even in arid areas. This allocation should be conditional on feed ownership-feed responsibility and reclamation plantings. Because these areas are used year round there has to be a balanced production of grass, browse and fodder trees (drought refuge). Water harvesting is the key to reclamation and the planting of browse/trees. Land can be allocated by a combination of small plots close by and larger plots further out. The allocation should not be freehold as this limits the scope for reallocation of land not reclaimed. A system of laneways is necessary to control access. Living fence plot boundaries are advisable. Euphorbia seems acceptable. A series of commercial/credit micro-projects become necessary for grass seed multiplication and nursery production of browse shrubs and fodder trees, provision of draught power for water harvesting, etc. The problem of absolute limits in carrying capacity, even when reclaimed, must be firmly tackled.

116. To prevent further areas of deterioration water points should not be developed without clear definition of the user group and prior feed ownership-feed responsibility being demonstrated. The output of boreholes should be restricted to supply only those stock the surrounding area can sustain without deterioration. User groups should be free to organize reciprocal arrangements covering drought movement.

117. Pilot projects should be undertaken to look at the sociological and practical problems involved in reclaiming sacrifice areas around towns and permanent water points.

### C. Pasture - Range Development in ASAL Agricultural Areas

118. A check list of plants collected and evaluated for different ecological zones is in table 11.

119. Shifting Agriculture. Simple demonstration/experiments are needed on managed bush density, for soil regeneration and grass-browse livestock production. Increasing the proportion of leguminous plants should be considered, herbaceous stylos, acacia shrubs/trees, Prosopis spp.: planted after crop. Current acacia distribution is more limited by germination requirements than growth requirements. The ground cover is weak in bush fallow areas. Grass is readily grazed out and sheet erosion occurs underneath. As the local sheep and goats and cattle are adapted to a high browse diet, the necessity of ground cover may relate more to soil management than livestock production. Simple draught constructed contours or staggered furrows would serve a number of soil management purposes: sheet erosion control; increased forage production; water harvesting for crops and as a guide for contour cultivation to increase moisture conservation. In areas of lower slope, contour ditches may replace furrows. The sowing of grass at the commencement of bush fallow would increase livestock production. Seed of suitable grasses (and herbaceous legumes) could be produced on-farm: Cenchrus ciliaris, Eragrostis superba, (stylos). Either direct sowing of treated seed of leguminous browse/fodder trees in furrows or planting seedlings requires a seed source and treatment or nursery organization.

120. Simple management tools are available to increase the productivity and stability of bush fallow systems: (a) planting of adapted grasses at the commencement of bush fallow; (b) contour-staggered furrow moisture harvesting; (c) planting leguminous herbs/shrub/fodder trees. Simple demonstration trials on managed bush fallow density are desirable, examining multiple use soil management/livestock production/forest products.

121. Mixed farming. The common/private grazed areas in mixed farming ASAL are grossly degraded, eroded and unproductive for the most part. The ICRAF total catchment approach with a balance between trees-crops-livestock, is an admirable approach. But in a large portion of ASAL farming areas a simpler approach of land allocation, combined with a programme to encourage individual feed ownership-responsibility, may be more appropriate. This allows a whole farm approach to soil-moisture conservation and easier control of grazing. Soil reclamation work can still be done on a group basis as for private terrace construction on crop land. Agroforestry has a role in such whole farm planning, for drought fodder, dry season browse/fodder, green manure, honey, fruit, fuel, shade and shelter for stock, etc. But block plantings of trees in areas subject to grazing can cause continued

erosion. Strategic location along laneways, boundaries, subdivisions, terrace edges, contour lines, and houseyards should replace block sowings. Drought fodder reserves should have a high priority along with seasonal browse.

122. The principal work needed is revegetation of ground cover to reduce run-off and erosion, and conserve moisture. Run-off control can stop gullying and allow healing without costly structures. In areas too badly eroded to contour, pitting will replace staggered furrows as the simple technique to harvest water and disturb soil to get good establishment. If the soil is suitable, furrows or pits can be constructed with a mouldboard ox plough; wet or dry. Very hard exposed subsoil may require hand dug pitting. An example of large hand dug "eyebrow" banks was seen north of Kitui. These may have been overdesigned but they will be permanent. Subdivision work in future years will be necessary on such subsoil areas, to promote colonisation of the interspace. It is better to divide the labour over simpler pits over a period of years. Seeding of grasses and legumes will be necessary on these areas as little seed exists on site. Seed can be grown on-farm but a local commercial producer is possibly more suitable. Sets of bana or bajra grass may be planted across gully bottoms to act as silt traps and take advantage of the moisture and fertility. Grass and legume and tree recommendations have been made. Zero grazing during the growing season allows maximum growth and seed set. Some fodder trees need protection from grazing (thorn branches) while others are self protecting. Water development should be conditional on development of such land responsibility. Group activity for reclamation work has already been demonstrated in Kitui.

#### D. Livestock Production

123. Livestock Improvement. Extension in livestock improvement needs to be reoriented to increasing efficiency of production of indigenous milk-meat livestock as much as local specialised meat or milk production. These packages are not limited by available knowledge or technical skills but rather a lack of direction in orientation. The particular attributes of adaptation of the local animals need to be analysed and livestock breeding criteria developed to enhance these attributes, as well as the introduction of genes from other breeds to reinforce these characters. Apart from climatic disease adaptation, the size of local animals is usually an adaptation to the environmental factors most influencing selection. These may be social factors of the environment as well as physical factors.

124. Livestock improvement needs to concentrate on practical systems of selection and the introduction of controlled breeding. Controlled breeding has two aspects, breeding of selected sires and dams to increase the combination of desired characters, and, control of time of breeding. Control of time of breeding is usually dependent on seasonality in rainfall and can even be beneficial in arid areas. Controlled breeding enhances selection for fertility and mothering ability, as well as comparisons of growth rate. Controlled breeding and selection are not usual features of natural production systems in ASAL areas, but not altogether unknown. They need to be demonstrated.

125. Extension in animal health needs to concentrate on finding economic answers to local health problems, according to the size and type of production and ability to pay, both subsistence and intensive production. Questions which need addressing include, the economic effect of endemic

130. Skins and hides. The amount of slaughter outside the main slaughterhouses is variously estimated. A reasonable assumption may be as high as 50%. Skins and hides are a significant portion of the value of animal production. The loss in value of skins and hides through poor preparation of privately slaughtered and small town slaughtered animals is a national as well as private loss. Training in the initial preparation and caring of skins/hides is required along with establishment of dealers for both the input supplies and equipment (flensing knives, tanning compounds, etc.) and the establishment of market linkages with the major new tannery or traditional processors.

131. Poultry. Improvement in poultry production in ASAL areas requires several inputs. The first is better feeding, the second is better genetic resources, the third is better night housing and health care. All of these things can be tackled in training on a household or village level. The production of better poultry for local marketing and eggs for sale or home consumption ties in with the need to find market outlets for sorghum and millet production in exchange for maize purchases. The feeding of ASAL poultry can be based on sorghum/millet grain and protein leaf from Acacia/Prosopis/Leuceana/Cassia fodder trees. Input supplies of young chicks needs to be organised as well as seed/seedlings of fodder trees. Young chicks brought up in village free range conditions adapt to the environment. Immunisation is advisable before introduction.

132. Health Care Supplies. The lack of availability of animal health care supplies is a restriction on the development of self-help in ASAL animal health care. Such supplies could include hand sprays for tick control. Credit facilities for stock are a means of increasing supplies in remote areas. Stockists should be advised by the Veterinary Service on the products suitable and economic for a district, rather than relying on commercial sources of information.

133. Dairying. There is increasing scope for specialised dairy production around ASAL towns, for milk production. The population of these towns is steadily increasing and many of them are already undersupplied with dairy products. In the marginal mixed farming areas grade dairy cattle may be preferred but dairy goats would be more efficient producers and less susceptible to death in droughts. In the more arid areas dromedary camels would be more suitable. There is considerable potential for rapid improvement in camel milk production under improved nutrition, with attention to breeding. Where the opportunity exists, small-scale irrigation (from bores/wells/rivers) will provide the continuity of feed necessary for increased intensity of production (eg. as at Isiolo and Garissa). Water harvesting will improve forage production also. Specialised dairy animals require special attention to intensified feed supplies. Suitable species/varieties of perennial grasses and forage crops and fodder trees have been identified for all zones (table 13).

134. Large-Scale dairying. The GOK is interested in the extension of dairying for urban markets, into the rangelands of Narok and Kajiado Districts. Of these the medium potential areas of Narok district has most potential for extensive dairying. The climatic conditions are suitable for the introduction of herbaceous legumes to reinforce the natural grassland pastures, and on suitable soils the sowing of replacement pastures. The balance of Narok district is zone V-5, upper midlands, where the climate is ASAL by definition but the temperatures are sufficiently reduced to consider pasture reinforcement.



E. Breed Improvement and the Stud Industry

135. The need to improve productivity of livestock has long been recognised in Kenya, with emphasis in the highlands for meat and dairy animals. But there has been emphasis on per head production with little comparison on efficiency of production units on a per hectare basis, resulting in the emphasis on big breeds and selection of big animals within breeds. For example: improved Boran cattle are now twice as large as unimproved Boran, requiring twice as much land for maintenance of breeding units.

136. There has been some extension of this interest into the midlands and to a lesser extent the coast. There has been less interest in the drier semi-arid and arid areas of the country, by livestock improvement segments of the Ministry. The problem of disease adaptation in the midlands and coast has been a major drawback, with complete protection being the Government approach though not necessarily the most economic approach for ASAL.

137. There is need for government activity in several areas to support the development of studs. (1) The development or support of breed societies and stud book registers, in the initial phase, is one area of activity. (2) Another area which must be tackled if producers in all areas are to have access to improved livestock is the adaptation of stock to the particular climatic and disease regimes of different districts (divisions). (3) A further area needing urgent attention is the selection of indigenous breeds on the basis of dual purpose, milk-meat production to suit the dominantly subsistence production strategy of the majority of livestock owners. This latter is just as economically important in the national economy as the development of specialised meat and milk producers.

Breeds of interest to ASAL: Breed Society/Stud Development

Goats: Galla, East African (local types), Boer.

Dairy Goats: Boer, Nubian, (intensive local industry development)

Sheep: Red Masai, Black Head Persian, Somali Fat Rump, Dorper

Wool Sheep: Merino, Corriedale, (overlap into ASAL)

Cattle: Boran, East African Zebu (several local ecotypes), Sahiwal,

Camel: Bactrian, Dromedary.

138. Multiplication centres have been initiated under the sheep and goats projects. They have gone through various stages of expansion and contraction. The sale of progeny from most of them is less than 5% offtake. Multiplication/adaptation centres were conceived as training centres with improved stock; and have turned into de facto stud farms in the major centres, with costly demands for labour and infrastructure development. The emphasis should be on multiplication and selection as a simple herd improvement exercise, and leave stud breeding to private enterprise. A number of small multiplication centres would be simpler to manage and serve the needs of industry better, including the fundamental one of demonstration within the District. The stud industry can be started at a moderate level of proficiency and built-up under the extension guidance of the Ministry. Its foundation stock do not have to have pedigrees developed at Government

expense. The ODA project farm at Tharaka is well established and providing 200 Galla bucks a year with a target of 500. With this type of demand a local stud industry should be established and the facilities used to develop other adapted and local breeds.

139. Multiplication/adaptation centres in each district are desirable for climatic and disease adaptation of improved breeds for (a) subsistence milk-meat production, (b) meat production, (c) milk production: as a source of livestock for developing local stud industries. These centres should also be used as selection centres for local indigenous breeds, to improve production performance and initiate local stud development. The ADC may be a suitable candidate to run such centres away from the bureaucracy. Such centres should have a phased obsolescence.

#### F. Marketing

140. The availability of markets for both output sales, and, production and domestic input commodities is a limiting factor in ASAL development. IPAL have highlighted this factor in their studies and pointed to the neglect of whole regions of the country in any aspect of market development. The Wamba project is providing credit for the establishment of "general stores"/duka and is assisting experiments with alternate livestock marketing arrangements, both valuable exercises.

141. Although the Sheep and goat project plans to develop marketing in certain ASAL areas, from a producers viewpoint there will still be large regions not serviced by a formal market. Extension of feeder systems, even if only for special sales (with few/no fixed facilities) would greatly improve the social and economic conditions of isolated nomads and pastoralists. The issue of credit to develop domestic input marketing in remote areas and small "general stores"/duka needs further consideration.

142. Hand-in-hand with marketing is the access to "banking" facilities in ASAL areas, particularly savings and small loans accounts. Support for the development of agencies/branches of a savings and loans credit union/banking system in ASAL areas needs investigation. AFC may be a suitable vehicle to launch such a system along with rural development credits.

143. Market intelligence is very important to people in isolated and underdeveloped areas. Market intelligence in livestock development not only deals with product prices in various areas and costs of transport/trekking comparisons, but seasonality of demand and supply, where improved livestock are for sale or required, veterinary health campaigns, etc. LMD is interested in extending activities in this area from its small beginnings. Finance is required to gather and analyse information, and distribute it in a timely fashion by radio and district newsletters.

## G. Rationale

### Rationale

144. People and their livestock are outgrowing the available resource. This is especially noticeable in areas of relatively high livestock population density AEZ V, permanent water holes, settlements, towns etc. where action is urgently needed. In other areas it may pay the people to continue to slowly degrade the resource and adapt by changing the livestock which they keep as circumstances require.

145. There have been many important initiatives to try to promote range improvement (WB livestock projects) and mixed farming - none have succeeded so far. Problems include social organization, common grazing, increasing population pressure. A change of land use will be the de facto result in the absence of range improvement so one must keep trying, but how? Is it possible to do more than the research stations are attempting at present without imposing a solution which whilst technically satisfactorily has failed in the past? Is it possible to use incentives to bring about range improvement? This was probably the philosophy behind group ranching which failed by and large.

146. The best chance to achieve range (and grazing) improvement would appear to be in association with high human population density. In the shifting cultivation/mixed farming areas where improvement of browse and pasture and promotion of integrated livestock crop systems should be possible on a limited scale. Improvement should also be tried near isolated spots of high density population where labour is available and an imposed solution may be acceptable in the absence of direct claims to the land.

147. Given this bleak scenario should beneficiary popular actions be taken which will exacerbate the situation? Should improved (normally larger) breeds, water and drugs be made more freely available which would make more areas available for grazing or would keep more animals alive? Both are temporary palliatives which will hasten decline of the resource in the absence of other actions. But they may have a place in overall development of the area if they are made available conditionally.

148. The possibilities for providing popular actions to the shifting cultivation areas, such as improved stock or work oxen, or restocking destitute families elsewhere, which could be linked to pasture development, should be examined. In the absence of a positive response expenditure of government funds on such actions should be questioned.

149. Marketing also has its part to play here. Improved access to markets or prices at the market will obviously influence trading. But how? As a generalization the poorer families are already marketing everything they can. More prosperous families market what they need to, depending on family circumstances or range depletion in time of drought. Improved price would remove some families from the margin, enabling them to operate as more prosperous families do, thus increasing pressure on the range and hastening degradation. In the absence of an alternative attractive investment this is the most probable scenario.

150. On the surface the promotion of bees, non ruminant stock, hides and skin improvement is peripheral and unimportant. Should they receive attention? Available evidence suggests a resounding YES. They are not competing for the resource which is deteriorating and they are capable of

providing badly required additional income for the poorer families. Provided appropriate activities are selected which are sustainable in the varying circumstances (eg. not rabbits: people don't like to eat them!; only poultry near a market etc.) every effort should be made to get such activities going.

#### IV. OPTIONS

##### A. Range Reclamation and Improvement

###### Range Reclamation

151. Pilot Projects Would have the objective of developing acceptable, replicable methodology for implementation of range reclamation by user groups in: (1) pastoral and nomadic situations; (2) town sacrifice areas; and (3) water points and in addition for the mixed farming areas.

152. Each of these initiatives would be based on demonstration and beneficiary participation. It is likely that the technical solution to be demonstrated will be site specific, designed around the circumstances and requirements of the user group. This implies initial survey and discussions prior to proposing a solution for which in general adequate technical information is already available. As part of the deal the beneficiaries would agree to govern protection and exploitation of the development, thus precluding the need for expensive enclosures, or the employment of guards. Incentives could be built into the programmes in likely to take the form of improved water supplies, access to drugs, or organization of improved, self-help marketing.

153. Reclamation techniques would include pasture reseeding, planting of browse species and closing off areas to allow tree recovery above the height of normal browsing. The measures applied would usually be accompanied by some form of soil disturbance or moisture harvesting. In order to allow continued grazing of stock in the area, a gradual approach to redevelopment would probably be necessary. However where pasture species are involved grazing would probably only need to be avoided during the growing season. Even with perennials it may be possible to provide temporary protection with cut thorn thicket.

154. The pilot programmes would be the responsibility of MLD probably the Range Management Division or in mixed farming areas the Livestock Development Division. Extra assistance could be obtained from the Research Services of Government, IPAL or ILCA.

155. In order to make the pilot programme effective seed and seedling supplies would have to be assured and mechanical assistance with soil disturbance might be necessary. If improved stock were to be used as the incentive assured supplies would be needed well in advance and similarly if water supplies are to be used arrangements would need to be made with the appropriate unit of MOWD or MOA.

###### Range Improvement

156. Demonstrations in Bush Fallow Areas. The objective is to demonstrate the available technology of water harvesting and grass planting at the commencement of the bush fallow to increase forage supplies.

Development of feed ownership rights is desirable to protect the person investing in the sowing.

157. A chain of input seed sources is required to be developed from the research source through local commercial multiplication to the on-farm multiplication in the bush fallow system, for planting after each cropping cycle. This could be linked through the Districts to the development of nurseries for reclamation of grazing lands in mixed farming zone V areas. The initial demonstrations have two components: the demonstration of post cropping sowing and demonstration of on-farm seed production. Demonstrations are required in the shifting agriculture areas of Eastern Province and Coast Province but can probably only be implemented in Eastern Province. The District Range Officer should have responsibility for executing the programme.

158. The beneficiaries of the demonstrations should contribute to the cost of inputs but in particular provide the labour and draught for simple water harvesting and sowing. The main cost in the demonstrations is travel operating costs in establishing sites, training participants and checking grazing capacity of production.

159. Demonstrations on Subdivided Range Areas. The objective is to demonstrate the available technology to increase productivity of rangelands, to allow intensification of production on individual holdings.

160. The areas most affected are in southern marginal rangelands and northern rangelands. In some areas the improved production will result from increasing grass-browse balance, others from reclamation of ground cover grass production, others reinforcing grass pastures with adapted herbaceous/browse/fodder tree legumes. Drought refuge plantings are important in development of all individual farms. Moisture conservation, simple water harvesting techniques is an integral part of increased production.

161. A chain of input seed sources is needed to develop supplies for demonstration and then commercial exploitation. In the initial stages of demonstration government sources of input seed/seedlings are required. These should be developed in each district because the individual requirements of each district will differ, because of different altitudinal zones and hence different species adaptation. Also the soils will differ within and between districts and the species adaptation is often soil related, especially legumes (even though in past generalisations about savanna, soils were considered less important).

#### B. Animal Health

162. The objectives are: (1) to supply drugs and equipment in areas where there is demand but no supply; (2) for producers to strategically reduce endo and ectoparasites; (3) for Veterinary Officers to conduct appropriate group training demonstrations of simple animal health procedures; (4) for veterinary officers to use the "additional disease control activities" of the animal health rehabilitation programme to start treating the economically important diseases of ASAL livestock contributing to cumulative effects of high mortality, abortion and ill thrift;

163. The area to benefit from the supply of stock credit for retailers of animal medicines would be outside those already serviced by veterinary clinics, private traders, the market locations to be addressed in the ADB Sheep and Goat Project, at location/sublocation level. These areas are most likely to be found in nomadic and pastoral systems, but the shifting agricultural system is also sufficiently remote from the development of services to need this input.

164. Extension training of producer groups is necessary, progressively throughout ASAL, in association with development of stockists and development of demand for stock; and in improving efficiency of treatment where stockists demand already exist.

165. The bulk of the group training and additional disease control activities would be most conveniently handled during CBPP and rinderpest vaccination campaigns. The economically important diseases will vary from district to district.

### C. Improvement of Local Breeds

166. The objectives are: (1) to initiate the process of local improvement of local breeds throughout ASAL, for all types of livestock; (2) to reintroduce selected animals of indigenous breeds to their traditional areas of use; (3) to develop district adaptation centres (ADC farms/minor research stations/training centres) to run selected flocks/herds of local breeds as a demonstration and prelude to development of a local stud industry in each district.

167. The orientation of livestock improvement needs redirection in ASAL areas to work within the environmental and economic constraints. This means putting the major emphasis on improving local breeds by selection and controlled breeding. Training of selected farmers and direct in-herd/flock assistance with selection and controlled breeding should proceed together with general extension on local breed improvement.

168. Improved Boran, Galla, Red Masai, Black Head Persian should be reintroduced into the traditional areas, through adaptation centres. Care must be exercised to use more efficient animals but not those greatly different in size from the local animals.

169. All ASAL districts/divisions need the gradual build-up of this programme. Where range degradation is common, range improvement should receive higher priority for funding. Pastoral and nomadic areas are more dependent on their livestock and should receive priority. Shifting agricultural areas are more drought prone than mixed farming areas and hence require more emphasis on livestock improvement. However the costs of establishing improved flocks of local breeds is substantial, and the management record on government farms needs considerable improvement before major investment is considered.

#### D. Improvement of Skins and Hides

170. The objective is to improve the quality of skins and hides resulting from home and ASAL town slaughtering.

171. The hides and skins service of the Veterinary Department would be supported. Commencing with ASAL towns the project would gradually work out into the less populated areas. Credit would be used to support additional stocks of input supplies and equipment. Assistance in the establishment of market linkages would be given the stockist to act as trader; or credit to traders to become stockists.

#### E. Microprojects: Other Livestock

172. The objective is to provide a series of alternative income-generating activities more specific to individuals: bees, draught animals, dairying and poultry.

173. Microprojects in bees consist of training programmes with supply of credit to purchase catching boxes, top bar hives, protective clothing, smoker, etc.. A second element consists of training in extraction and maintenance of extraction machinery with credit for purchase of machinery; together with assistance in organizing market contacts. Bee microprojects are suitable for all ASAL districts, but are more suitable in the marginal zone V areas.

174. Microprojects for draught animals have several phases: initial training in intensive forage production, of forage grasses and fodder legumes suitable for stall feeding and/or conditioning; development of forage resource; training in maintenance of draught animals; purchase of oxen, harness and tool bar. Credit is required for seed/sets/seedlings of forage, purchase of animal and tool bar. Because the oxen are required by farmers with few resources and limited land for production of sale surplus, the credit has to be long-term to allow repayment without hardship. One principle areas of need is in southern Embu, but all agricultural areas have pockets of need.

175. Microprojects in ASAL town dairy development also have several phases: initial training in intensive forage production, of suitable grasses and fodder legumes, especially those suitable for stall feeding; development of forage resource; training in maintenance of dairy animals and dairy hygiene; purchase of dairy goats or camels and basic milk containers, etc.. Credit is required for seed/sets/seedlings of forage, purchase of a suitable number of animals and milk containers. Credit needs are long-term, for new operations in a new industry.

176. Microprojects in poultry require training in feeding and bird care, development of a protein leaf source to supplement the sorghum/millet grain, purchase of vaccinated chickens and feed supplies credit facility for stockist of vaccinated chickens and credit for purchase of birds. The small market network connection to the larger towns in the shifting agricultural and mixed farming zone would allow selling of live poultry from within the area as a whole. Training can be done at the village level in groups.

#### F. Livestock Marketing Intelligence

177. The objective is to develop a market intelligence capacity within LMD by providing operating expenses. LMD has a sufficient staff distribution to gather market statistics from the major markets for rapid assimilation and timely distribution on radio and by district newsletters. District newsletters would contain such additional information as price trends, supply and demand analysis, who has what improved animals for sale, transport costs, etc..

178. The main operating expenses are telephone/telex links between Nairobi and the districts and between district LMD officers and other divisional sources for market or newsletters input.

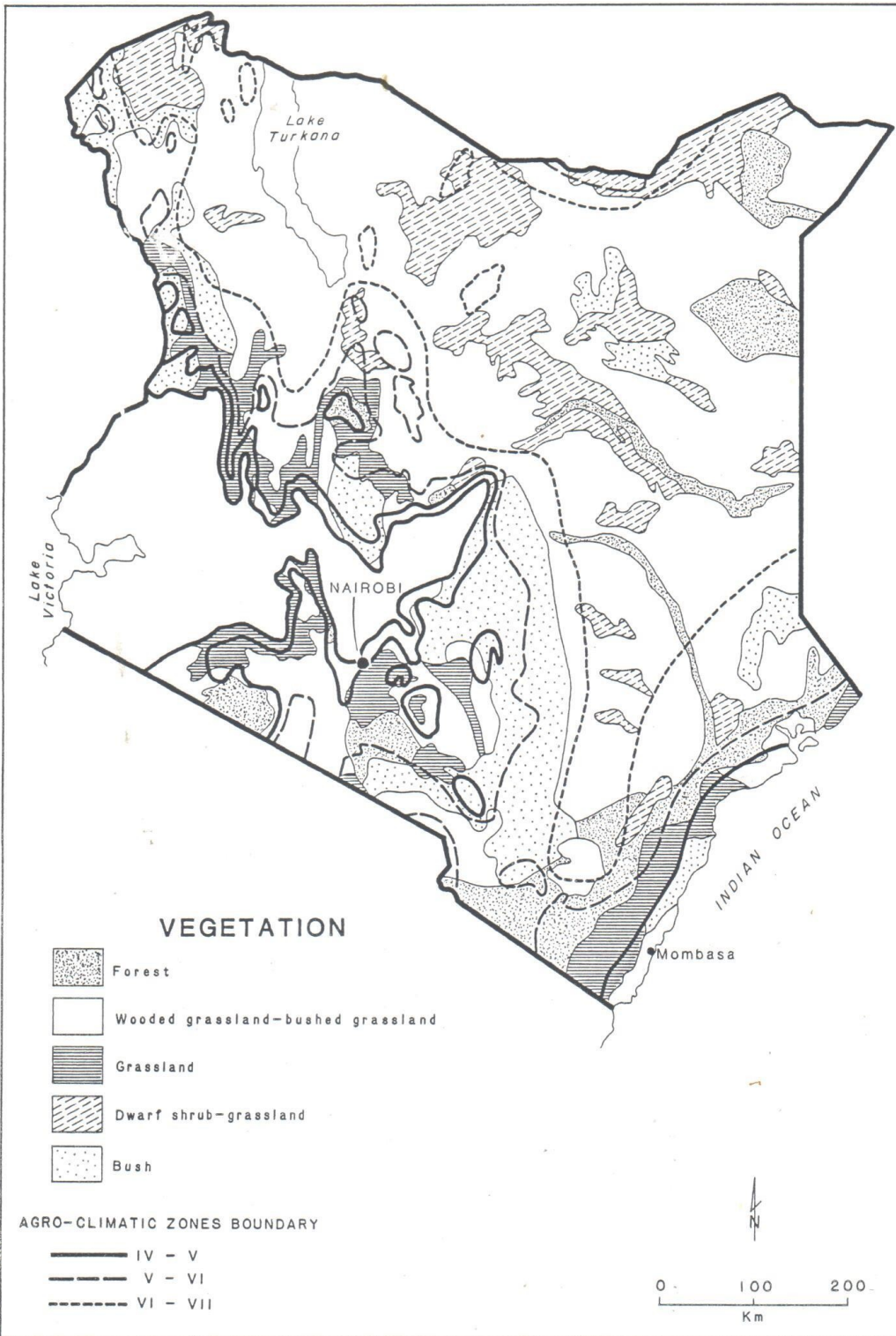
#### VI. ISSUES

179. The major issue concerning livestock is the apparent failure of all major initiatives to date to bring about effective development of the livestock areas. What should be done and could be done is technically well understood. Matching this to the needs, aspirations and social organization of livestock owners in the ASAL areas is not. Research is continuing into these aspects. Further support to research could be considered. Pending results investment should be minor despite the overwhelming importance of livestock to the inhabitants of the ASAL areas.

#### VII. FOLLOW-UP

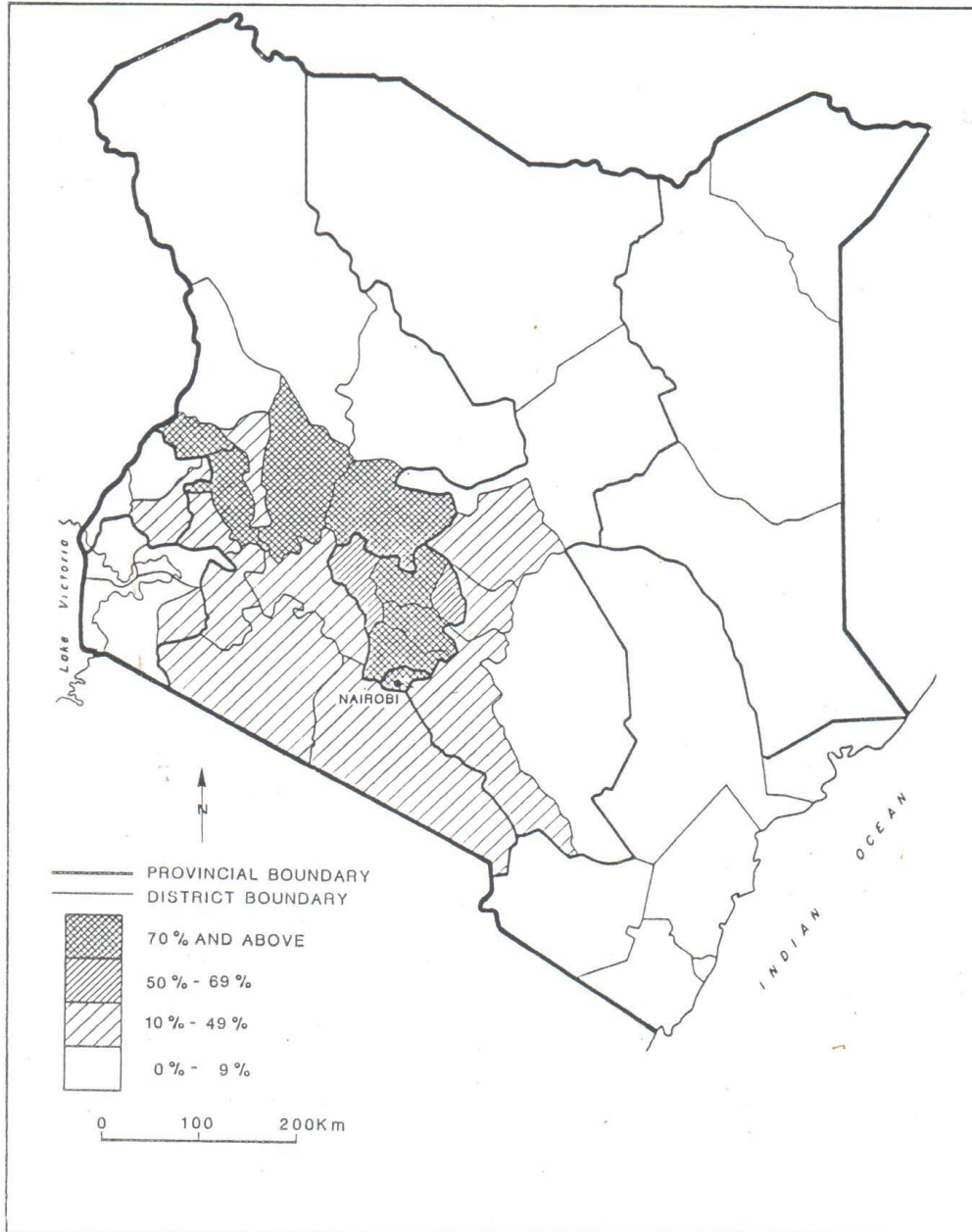
180. Large-scale livestock projects in the range areas of Kenya have been unsuccessful to date, whilst small-scale projects have had measures of success and failure. The reasons for success or failure should be critically examined. Tentative conclusions should be drawn and possible criteria developed for future livestock projects. A paper would be produced for discussion at the forthcoming workshop on ASAL development. Terms of Reference are attached.





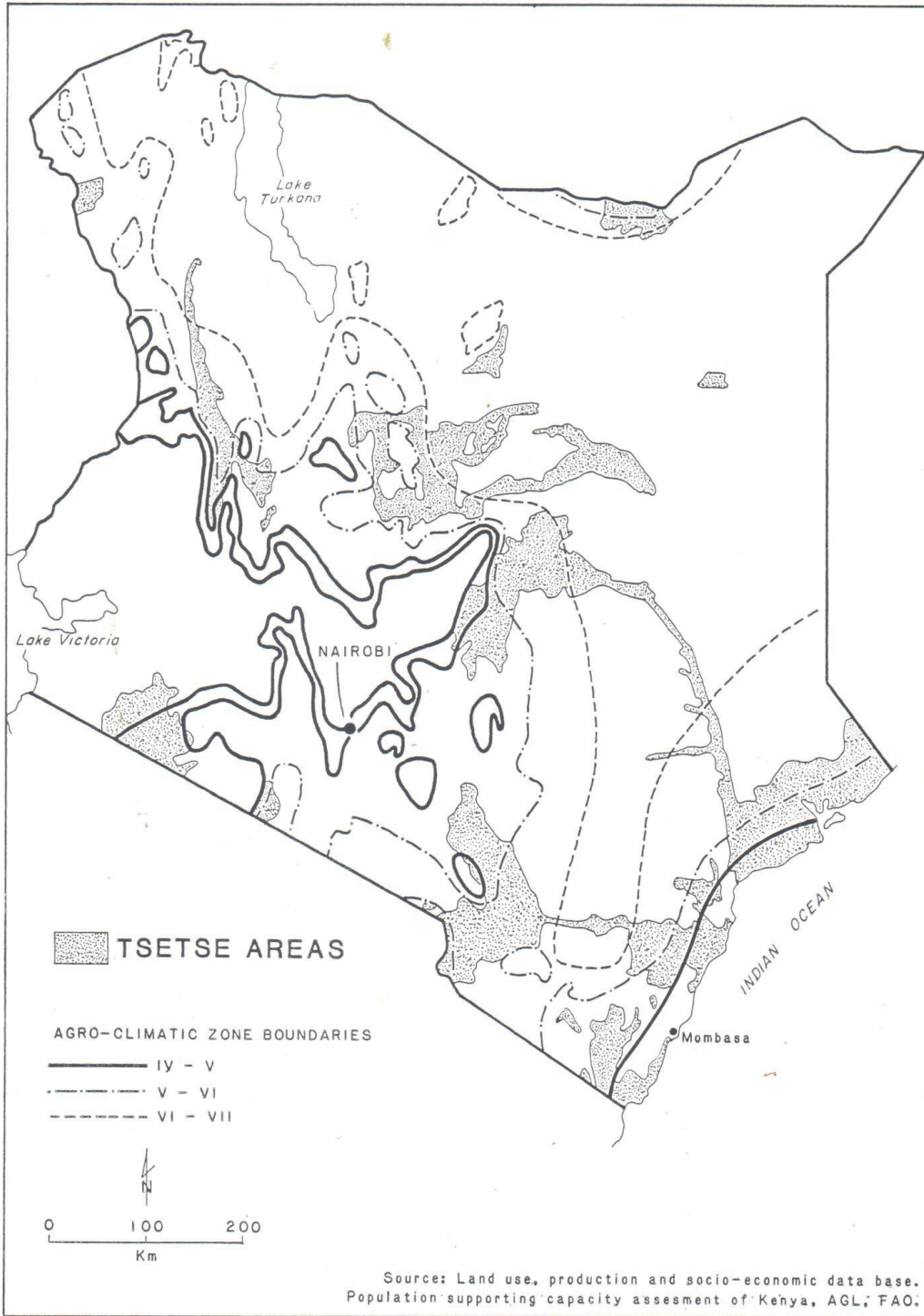
KENYA  
ARID AND SEMI-ARID LANDS DEVELOPMENT

DISTRIBUTION OF EXOTIC BREEDS OF DAIRY AND BEEF CATTLE

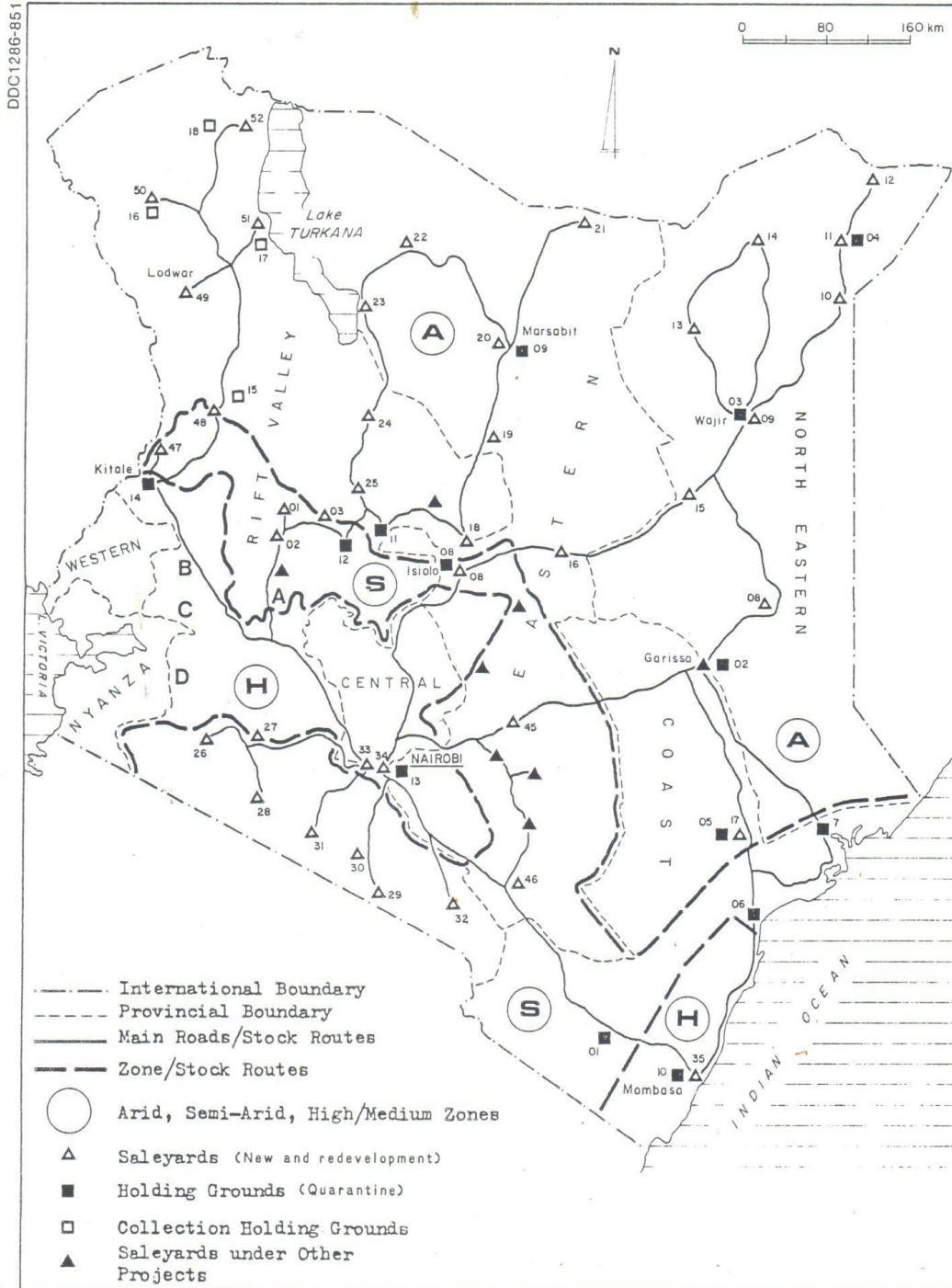


DDC485-237

K E N Y A ——— ARID AND SEMI-ARID LANDS DEVELOPMENT



REDEVELOPMENT OF BUYING STATIONS AND HOLDING GROUNDS



## KENYA

## ARID AND SEMI-ARID LANDS (CASAL) DEVELOPMENT

Characteristics of the Agro-Climatic Zones. - Kenya Soil Survey (1982), Braun, et al. (1990)

Moisture Availability Zones with an indication of rainfall, evaporation, vegetation, potential for plant growth and risk of crop failure

Zone	r/FO (%)	classification	average annual rainfall (mm)	FO potential evaporation (mm) excluding areas above 10,000 ft altitude	Vegetation	Potential for plant growth assuming that soil conditions are not limiting	risk of failure of an adapted maize crop
IV	40-50	semi-humid to semi-arid	600-1100	1550-2200	dry woodland and bushland	medium	low (10-25%)
V	25-40	semi-arid	450-900	1650-2300	bushland	medium to low	high (25-75%)
VI	15-25	arid	300-550	1900-2400	bushland & scrubland	low	very high (75-95%)
VII	15	very arid	150-350	2100-2500	desert scrub	very low	extremely high (95-100%)

+ For regional differences see table 8 of report E1

Temperature zones with an indication of mean maximum, mean minimum and absolute minimum and absolute maximum temperatures, night frost and altitude

Zone	mean annual temperature (C)	Classification	Mean max. temp. (C)	Mean min. temp. (C)	Absolute min. temp. (C)	Absolute max. temp. (C)	Night frost	Altitude (feet)	Altitude (metres)	General description
6	14-16	fairly cool	20-22	8-10	0-2	7000-8000	rare	2150-2450	2150-2450	Lower Highlands
5	16-18	cool temperature	22-24	10-12	2-4	6000-7000	very rare	1850-2150	1850-2150	
4	18-20	warm temperature	24-26	12-14	4-6	5000-6000	none	1500-1850	1500-1850	
3	20-22 *	fairly warm	26-28	14-16	6-8	4000-5000	none	1200-1500	1200-1500	Midlands
2	22-24 *	warm	28-30	16-18	8-10	3000-4000	none	900-1200	900-1200	
1	24-30 *	fairly hot to very hot	30-36**	18-24**	10-16	0-3000	none	0-900	0-900	Lowlands

\* These are averages for the whole country, for areas in west of the Rift Valley the temperature range is one degree warmer and for areas east of the Rift Valley one degree colder than indicated.

\*\* At the Coast 28-31 and 20-23 resp.

KENYA  
ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Relationship of Principle Crop\*, Subsistence Farming, and Livestock  
Production, by Agro-climatic units. (A. Jatzold 1982)

Principle Crop (after Jatzold 1982): Farm Systems/Land Use

Alpine	9				
Upper Highlands	8				
	7				
Lower Highlands	6	Cattle			
	5	Sheep			
		Barley	Ranching		
		(wheat)			
Upper Midlands	4	Sunflower	Sorghum*		
		Maize			
Lower Midlands	3	<Maize>	(Maize)	Ranching+	
	2	(cotton)	Millet*		Nomadism
Lowlands	1	Cassava	Millet	Ranching+	Nomadism
	1	<Maize>		(millet)	
Temperature					
Moisture		IV	V	VI	VII
A	9				
UH	8				
	7				
LH	6	MF-R-P			
	5	MF-R-P	MF-R-P		
UM	4	MF-R-P @	MF-R-P	P	
	3	MF @	MF-R-P @	P	
LM	2	MF @	MF-R-P @	SF-P @	N
L	1	MF @	MF-SF @	SF-R-P-V @	N @
			R-P-N-V		

MF - mixed farming, SF - shifting agriculture, Pl - plantation crops  
D - dairies, R - ranching, P- pastoralism, N - nomadism

V - vacant state lands, chronic Tstse problems

\* Largely replaced by early season maize

+ pastoralism/nomadism more than ranching

@ Tstse Endemic problem in large pockets within these zones - more a  
problem along rivers in zones VI/VII.

<> also economic activity

() marginal

Livestock Enterprises

A	9				
UH	8				
	7				
LH	6	Beef			
		wool-mutton			
	5	(Dairy)	Beef (dairy)		
		<cattle, sheep, goats>	<cattle, sheep, goats>		
UM	4	(Dairy)<Beef>	<Beef>		
		<Cattle,sheep, goats>	<cattle>	cattle	
	3	<Beef>	<sheep,goats>	sheep,goats	
		<cattle,sheep, goats>	(camel)	camel	
LM	2	(camel)			camel
L	1	<Beef>-V	<Beef>-V	cattle	sheep
	1	<cattle-sheep, goats>	<cattle-sheep, goats>	sheep	goats
		(camel)	(camel)	goats	cattle
				camel	

(Ranching and pastoralism is not continued to the ASAL areas)

- Beef - fattening and breeding potential. <Beef> - also economic activity.
- <Beef>-V - development of ranches on coastal tsetse country very difficult
- Dairy - principle "crop" activity
- <Dairy> - also an economic activity (dairy) - potential discussed
- <cattle> - East African Zebu type, dual purpose milk-meat, subsistence cattle.
- Cattle - breeding herds, immatures and adult sales. Boran and E.A. Zebu, less milk.
- <Sheep, Goats> - East African Goat (and others) - Fat Rump and Red Masai sheep, dual purpose milk-meat subsistence sheep and goats.
- Sheep, goats - East African Goat, Galla Goat, Persian Black head, Somali Fat Rump sheep, Red Masai - subsistence meat-milk (less milk in some).
- Wool-Mutton - <>-()- specialised european breeds for wool and fat lambs.
- Camel - milk, transport, meat, both dromedary and bactian types, draught potential.
- (Camel) - potential to introduce to better utilise forage supply, provide draught power.

KENYA  
ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Extent (in 1000 ha) of the moisture availability/temperature zone combinations of the agro-climatic zone map

Average annual r/EO %	Average (C) annual temp.							Total Area per zone
	1	2	3	4	5	6	7	
	24-30	22-24	20-22	18-20	16-18	14-16	12-14	
Temperature zone								
Moisture availability zone	0-3000	3000-4000	4000-5000	5000-6000	6000-7000	7000-8000	8000-9000	
40-50	480	360	840	450	570	150	0	2870
25-40	3230	1940	1460	1260	840	0	0	8730
15-25 (15)	9540	2700	240	160	0	0	0	12640
VII	26360	170	0	0	0	0	0	26530
								45.6

Source: Braun et al (1982)



KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Major Disease Constraints of Different Livestock Production Systems in Kenya

Pastoral Camel Production Systems:

Trypanosomiasis, mange and helminthiasis

Unimproved Traditional Cattle Production Systems:

Rinderpest, contagious bovine pleuropneumonia, ticks and tick-borne diseases, clostridial diseases, pasteurellosis, anthrax, helminthiasis, fascioliasis, trypanosomiasis, streptothricosis, lumpy skin disease, Rift Valley fever, malignant catarrhal fever, mineral and nutritional imbalances, tuberculosis, colibacillosis and pneumonias.

Improved Beef and Dairy Production Systems:

Foot and mouth disease, Rift Valley fever, clostridial diseases, anthrax, ticks and tick-borne diseases, trypanosomiasis, helminthiasis, fascioliasis, streptothricosis, lumpy skin disease, brucellosis, infectious bovine rhinotracheitis, infectious pustular vulvovaginitis, vibriosis, trichomoniasis, infertility relating to management and nutrition, mineral and nutritional imbalances, mastitis, pneumonias, foot rot, tuberculosis, Johne's disease, leptospirosis, salmonellosis and colibacillosis.

Sheep and Goat Production Systems:

Blue tongue, Rift Valley fever, contagious caprine pleuropneumonia, helminthiasis, fascioliasis, trypanosomiasis, ticks and tick-borne diseases including Nairobi sheep disease, mange, orf, sheep pox, goat pox, clostridial diseases, mineral and nutritional imbalances, foot rot, mastitis, pneumonias, brucellosis and salmonellosis.

Poultry Production Systems:

Newcastle disease, fowl plague, fowl pox, Marek's disease, mycoplasmosis, coccidiosis, helminthiasis, nutritional and mineral deficiencies, and salmonellosis.

Pig Production Systems:

African swine fever, colibacillosis, salmonellosis, helminthiasis, vibriosis, erysipelas, transmissible gastroenteritis and pneumonias.

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Adaptive resource strategies of East African pastoralist (Hadley 1984)

<u>Examples of ingredients of resource use strategy</u>	<u>Strategic importance to human populations and/or resource base</u>	<u>Present day trend or implications for the future</u>
<u>Movements to assure food among patchy, fluctuating, low density resources.</u>	Mobility of herds & settlements enables close tracking of environmental conditions, and helps balance water and food inputs to animals	Restriction of movements of pastoralists and herds. Increased sedentarization.
Restricted zones of better resources, (permanent water courses, swamps, highlands, etc.) used as fall-back areas for stock and humans during stress periods.	Existence of resource reservoirs helps maintain condition of larger areas of range.	In modern developments, schemes use such zones as high potential areas, suitable for intensive exploitation - thus undermining long-term viability of extensive range areas.
Dispersed human populations with large home ranges and temporary clusters of herding groups.	Dispersion spreads risk of extermination, allows for ready recolonization, facilitates flow of information about changing environment, increases physical security.	Increased concentration of permanent human settlements.
Large number of herd owners with high degree of autonomy and individual decision making.	Individuation of herding units permits very wide range of response behaviour to changing situations.	Trend to ownership of animals by non-pastoralists. Development schemes often based on collective decision making, and assume pastoralists will act in manner contrary to way that has assured survival.

ANNEX 8  
Table 5a

Small animal management groups, within large natural resource allocation units and with access to large areas of land and to jointly owned watering points.

Human behaviour at several levels of social organization (family, neighbourhood, subtribe) keyed to resource dynamics.

Maximization of population through polygamy, association of young fertile females with older, resource owning males.

Age, sex structure and (often mixed) species composition of livestock herd attuned to dynamics of savanna.

Small animal management groups allow for labour-intensive control of water and grazing. Possibly, manipulation of livestock groups corresponds to patch dynamics of grazing resource.

Social organization allows flexible and sensitive response to resource fluctuations in natural environment.

Maximal human increase facilitates survival of livestock, range pastoralism being labour-intensive.

Herd design facilitates utilization of both browse and grass species, and of periodicities of reproduction and growth to be fitted to task of providing continuous human food.

Trend to large groups of animals. Control of pastoral lands passing from pastoralists into hands of new groups. Loss of pasture to agriculture.

Breakdown of parts of social organization (e.g. lending or giving animals to destitute families) leading to permanent exclusion of poor households from pastoral economy. If pastoralists are to survive, some functions of traditional social forms need to be recreated.

High mortality of livestock and humans associated with r-strategy of pastoralists not acceptable to most countries.

Herd design reflects pastoralists intentions and degree of success in responding to savanna dynamics.

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Changes in Population over the 1983-84 drought ('000s)

(Livestock Development, Division, Annual Reports)

Province District	% ASAL	Zebu+ cattle		Sheep*		Goats*		Camels (both types)		Donkeys (all types)	
		1983	1985	1983*	1985	1983	1985	1983*	1985	1983	1985
<b>Rift Valley P</b>											
Turkana	100	190	158	700	457	900	685	100	-	20	-
Samburu	>85	160	92	240	96	290	150	10	8	8	.2
Kajiado	>85	682	436	720	663	480	236	-	-	17	-
W. Pokot	+50	70	130	160	157	160	146	2	-	6	-
Baringo	+50	60	85	207	200	400	580	27	5	3	4.0
Laikipia	+50	107	116	235	153	144	137	1	-	21	-
E. Marakwet	(50	94	80	146	109	125	63	-	-	2	-
Narok	(50	660	756	940	1,285	880	935	-	-	120	-
<b>Total</b>		<b>2,023</b>	<b>1,853</b>	<b>3,348</b>	<b>3,120</b>	<b>3,379</b>	<b>3,532</b>	<b>140</b>	<b>13</b>	<b>197</b>	<b>4.2</b>
<b>Eastern P</b>											
Marsabit	100	420	260	400	318	400	343	120	206	20	21
Isiolo	100	178	135	200	185	140	154	26	21	7	-
Kitui	>85	208	192	79	47	285	290	3	-	17	-
Meru	+50	190	202	176	223	32	290	-	-	11	-
Embu	+50	70	51	25	21	80	82	-	-	1	-
Machakos	+50	415	318	300	85	470	211	-	-	5	-
<b>Total</b>		<b>1,481</b>	<b>1,158</b>	<b>1,180</b>	<b>879</b>	<b>1,407</b>	<b>1,370</b>	<b>149</b>	<b>227</b>	<b>61</b>	<b>21</b>
<b>Northeastern P</b>											
Mandera	100	97	109	153	95	263	569	170	111	1	3
Wajir	100	170	182	125	71	180	427	220	145	2	3
Garissa	100	570	618	190	93	195	550	65	4	1	4
<b>Total</b>		<b>837</b>	<b>909</b>	<b>468</b>	<b>259</b>	<b>538</b>	<b>1,546</b>	<b>453</b>	<b>260</b>	<b>4</b>	<b>10</b>
<b>Coast P</b>											
Tana River	>85	253	163	124	45	181	186	45	47	5	-
Taita-Taveta	>85	110	130	27	35	112	145	-	.2	5	-
Kilifi	+50	180	493	32	10	184	100	-	-	-	-
Kwale	+50	122	134	50	77	170	230	-	-	.5	-
Lamu	(50	42	69	10	2	12	4	-	-	2	-
<b>Total</b>		<b>707</b>	<b>989</b>	<b>243</b>	<b>169</b>	<b>659</b>	<b>665</b>	<b>45</b>	<b>47.2</b>	<b>17</b>	<b>-</b>
<b>Total Kenya</b>		<b>8,397</b>	<b>8,035</b>	<b>6,795</b>	<b>6,509</b>	<b>7,486</b>	<b>7,860</b>	<b>789</b>	<b>548</b>	<b>319</b>	<b>42</b>

\* All sheep (< 500,000 wool sheep) \* all goats (< 26,000 dairy goats)  
+ Significant numbers of grade beef and grade dairy animals in some of these districts.

## KENYA

## ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Comparison of Drought Impact among Cattle, Sheep and Goats by Ranch Size, Ranch Type, Ecological Zone and Area Surveyed,  
Kaliado District, Kenya 1985 (Slaughtered-home consumption)

Ranch Type	Percent of Pre-drought Head														
	Cattle					Sheep					Goats				
	Died	Sold	Slaugh-tered	Total	Off-take	Died	Sold	Slaugh-tered	Total	Off-take	Died	Sold	Slaugh-tered	Total	Off-take
Individual	51	9	0.0	60	60	56	3	1	60	60	40	7	6	53	
Group	70	6	0	76	76	48	10	1	59	37	37	11	2	50	
Zone IV	78	3	0	81	81	54	4	0	58	43	43	4	0	47	
Zone V	47	14	0	61	61	38	19	2	59	28	28	22	4	54	

Source: Mukhabi et al 1985. Basically small ranches and individual ranches had better cattle survival, by dispersal, while small ranches had better sheep and goat survival, individual ranches didn't, probably keeping more animals for use. Survival rates higher in drier areas more used to drier seasonal conditions. Maize meal replaced milk as principle food item during and following drought; blood consumption occurred in only 1% of households.

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

An Estimate of the Economic Loss due to the 1983/84 Drought Impact on  
Livestock in Kajiado District, Kenya 1985

-----		
Kajiado District		
	Total Cattle	Total Sheep/Goats
-----		
1981 Herd (.000)	644	598
Mean Annual Growth Rate (%)	3.15	19.85
1983 Herd (.000)	685	859
1983/84 Drought off-take (%)	76	55
Post-drought herd (.000)	164	387
Drought Mortality - %	70	43
- Head (.000)	480	369
Value per head (Ksh.)	50	10
Direct Drought Loss (Ksh.000)	24,000	3,690

-----  
Source: Mukhebi et al 1985

In addition to the direct losses the following indirect and economic losses were calculated:

Indirect Drought loss (Ksh.000)	4,154
Economic loss due to drought (Ksh.000)	31,844

## KENYA

## ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

## Carrying Capacity Estimates of the Moisture Availability Zones

Zone	Average no. of growing days	Potential daily production (kg dm ha)	Potential dry matter production (kg ha year)	Consumable dry matter %	Consumable dry matter (kg ha year)	Carrying capacity (SU ha (potential))	Carrying capacity (ha SU (potential))	Major limitations to max. prod. in approx. order of importance
IV	180-235	40-50	7000-12000	40-50	3000-6000	1-2	0.5-1	husbandry, rainfall, fertility
V	110-180	25-40	3000-7000	25-40	750-3000	0.25-1	1-4	rainfall, husbandry, fertility
VI	75-110	15-25	1000-3000	15-25	150-750	0.05-0.25	4-20	fertility
VII	(75)	(15)	(1000)	(15)	(150)	(0.05)	(20)	rainfall, husbandry

Source: Braun et al (1982)

Note: One Stock Unit has an assumed weight of 300 kg and a dry matter intake of 3000 kg per year.

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Productivity Estimates: Stock and Human Carrying Capacity

	AEZ IV	AEZ V	AEZ VI	AEZ VII
Ha to sustain 1 livestock unit *	4 ha	10 ha	20 ha	40 ha
Livestock required to support one person (subsistence requirement)**	4	4	4	4
Ha required to support one person	16 ha	40 ha	80 ha	160 ha
Ha required to support a family of 7 people	112 ha	280 ha	560 ha	1120 ha
Maximum population density per km <sup>2</sup>	6 (8.9)	2.5 (3.6)	1.2 (1.8)	0.6 (0.8)

\* 1 livestock unit is equivalent to 450 kg liveweight

\*\* Supplemented by grain, 10 LU without grain.



KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Selected for the different Ecological Zones: Collection and Evaluation of  
Plants for Animal Production Project, Technical Report 1981

<u>Species</u>	<u>No. of Ecotypes</u>	<u>Recommended Area</u>
<u>LEGUMES</u>		
<i>Clitoria ternatea</i>	1	Coastal region
<i>Centrosema</i> sp.	1	Coast, Hinterland, Lake Region
<i>Desmodium intortum</i>	1	High potential areas
<i>Glycine wightii</i>	3	Medium potential areas
<i>Macroptilium atropurpureum</i>	2	Coast, Hinterland
<i>Medicago sativa</i>	2	Irrigated areas
<i>Stylosanthes fruticosa</i>	2	Arid and semi-arid range
<i>S. guyanensis</i>	6	4 high potential, 2 medium potential areas
<i>S. scabra</i>	1	Lake region and semi-arid rangelands
<i>Vicia dasycarpa</i>	1	Western high potential area
<i>Vigna unguiculata</i>	1	Coastal region
<u>GRASSES</u>		
<i>Cenchrus ciliaris</i>	4	Arid and semi-arid areas
<i>Chloris gayana</i>	3	2 high potential, 1 hinterland
<i>Eragrostis superba</i>	1	Coastal and semi-arid area
<i>Panicum maximum</i>	6	2 of each of high, medium & low potential areas
<i>Setaria sphacelata</i>	1	High and medium potential areas
<i>Pennisetum purpureum</i>	4	High and medium potential areas
<u>FODDER SHRUBS</u>		
<i>Atriplex nummularia</i>	1	Semi-arid areas
<i>A. halimus</i>	1	Semi-arid areas
<i>Leucaena leucocephala</i>	3	1 semi-arid area and 1 high and medium potential areas
<i>Prosopis juliflora</i>	1	Semi-arid areas

(*Ageropa* sp., being propagated in Coast Province, suitable ASAL areas)

These 46 outstanding number of species appear to be high but in taking into consideration the very wide range of habitats, we find that in each ecological zone one or two grasses and legumes are recommended.

LIVESTOCK

Terms of Reference

- Object: To prepare a discussion paper to be entitled 'Livestock Development in the Range Areas of Kenya Reasons for Success and Failure.'
- Qualifications: Degree in agriculture, range management with ten years experience of range development under Kenya conditions. Knowledge of and interest in the organization and motivation of pastoralists in addition to technical skills is necessary. Some knowledge of project design is essential.
- Terms of Reference: Analyse the content, organization and results of large and small-scale livestock projects in Kenya during the past 20 years. Assess actions which have been successful and to the extent possible attribute the reasons for success. Based on the analysis of available documentation and examination of ongoing projects define for discussion purposes design criteria which should be built into future livestock development proposals.

KENYA  
ARID AND SEMI-ARID LANDS DEVELOPMENT

AGRICULTURE

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APPENDICES

1. Varietal Recommendations for Major Zones - Sorghum and Millet
2. Terms of Reference

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ACRONYMS

AMS	= Agricultural Mechanization Services
AEZ	= Agroecological zone
BPSAAP	= Baringo Pilot Semi-Arid Areas Project
DAO	= District Agricultural Officer
FYM	= Farmyard manure
JTA	= Junior Technical Assistant
JT	= Junior Technician
KARI	= Kenya Agricultural Research Institute
KSC	= Kenya Seed Company
NEP	= National Extension Project
NSQCS	= National Seed Quality Control Services
r/EO	= Rainfall/evapotranspiration
RTU	= Rural Technology Unit
SWCS	= Soil and Water Conservation Services

KENYA  
ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT  
AGRICULTURE

I. INTRODUCTION

1. The ASAL areas of Kenya are those areas where the ratio of rainfall to evapotranspiration is less than 40%. The purpose of this Annex is to outline cropping possibilities in the ASAL areas to make tentative suggestions concerning possible investment to improve the agricultural potential, and to develop sustained agriculture in the ASAL areas.

II. BACKGROUND

The Extent of the Area

2. Zone V-VII in the ASAL areas occupy about 48 million hectares, more than 80% of the land area of Kenya. Within this area conditions are affected by precipitation and altitude (i.e. temperature).

Table 1

Extent in '000 ha of the moisture availability/temperature zone combinations

Average annual:

temperature °C	24-30	22-24	20-22	18-20	16-18	Total	%	
Altitude m	0-900	900-1200	1200-1500	1500-1800	1800-2100			
r/EO	MZ		Area					
25-40	V	3,200	1,900	1,500	1,300	800	8,700	18
15-25	VI(arid)	9,500	2,700	200	200	-	12,600	26
<15	VII(per arid)	26,400	200	-	-	-	26,600	56
Total		39,100	4,800	1,700	1,500	800	47,900	
%		81	10	4	3	2		100

-----  
Source: Agro-climatic zone map of Kenya  
r/EO - ratio rainfall to evapotranspiration  
MZ - Moisture Zone.

3. Table 1 demonstrates that some 82% of the ASAL area is arid or per arid, and that across zones some 82% lies in areas with average annual temperatures in excess of 24°C. Whilst this serves as a suitable preliminary definition of the prevailing conditions in the ASAL areas any judgement on agricultural development possibilities will require a site specific approach.

Rainfall

4. Much work has been carried out over the years to define rainfall conditions in Kenya. To date most information that is available concerns the high potential areas but, where ASAL areas fall within Districts which also have high potential areas, analysis has been carried out for zones V and VI. Information includes timing, probability and length of the growing season. In general to the East of the Rift Valley there are two distinct rainy seasons with a gap of several months between them whilst in the Rift Valley and to the west there is a single elongated rainy season with light rains occurring in mid-season normally around June (see main report, Map. 3). Within this scenario there are many local variations which have a critical effect on crop and crop variety selection and timing of planting. Local variations are increasingly critical as cropping possibilities become more marginal, and the relatively scarce rainfall is increasingly associated with high intensity storms.

Table 2

Generalized Rainfall and Growing Season Data

	<u>Average Annual Rainfall mm</u>	<u>60% Probability mm</u>		<u>Length of Growing Season</u>	
		<u>1st season</u>	<u>2nd season</u>	<u>1st season</u>	<u>2nd season</u>
AEZ V	650-800	150-300	150-200	75-87	55-74
VI	400-600	100-200	100-200	<40	<40
VII	<400	nd	nd	nd	nd

nd- not documented

5. The crop growing period at 60% probability levels is 75-87 days maximum whilst 60% rainfall probability is normally 250 mm or less per crop season. In areas where there is only one crop season intermediate rains which are insufficient to support an annual crop but which are capable of sustaining drought tolerant perennial crops or permitting a ratoon cereal crop may occur. In some areas supplementary irrigation has been traditionally used to allow production of otherwise unsuited crops such as maize (eg. Taita Hills, Lake Baringo, Turkwell Valley). In other areas where rainfall precludes conventional cropping advantage is taken of natural run-off harvesting to plant on the receding flood in depressions. For an extensive examination of rainfall conditions readers are referred to the Farm Management Handbook of Kenya and Agro-climatological Data, FAO.

Soils

6. Given the marginal rainfall and short growing periods associated with the ASAL areas of Kenya suitable soils are even more important than usual when areas are being selected for cropping.



Table 3

A Broad Estimate of the Dominant Characteristics of the Major Soil Classification Units in Kenya

(variable = more than 3 classes)

Major Soil Class, Unit	Texture subsoil	Texture topsoil	Depth	Organic matter Content of topsoil	pH (water)	Drainage	Workability	Fertility	Water holding Capacity	Remarks
Ferralsols	clay	clay	variable	variable	variable	good	moderate to good	low	moderate	
Luvvisols	clay	variable	variable	variable	above 5.5	moderate	moderate to good	low to moderate	moderate	
Acrisols	clay	variable	variable	variable	below 5.5	moderate to good	moderate to good	low	moderate	
Arenosols	sand	sand	variable	low	variable	good	good	low to very low	low to very low	
Cambisols	variable	variable	variable	variable	variable	moderate to good	moderate to good	moderate to high	variable	young soils
Fluvisols	variable	variable	variable	variable	variable	variable	variable	moderate to high	variable	Alluvial soil
Vertisols	clay	variable	variable	low to moderate	variable	poor	poor	moderate to high	high	Black Cotton soils cracking clay
Solonchaks	clay	variable	variable	variable	above 7	variable	variable	variable	variable	saline soils
Solonetz	clay	variable	variable	variable	above 7	poor	poor	low	variable	sodic (alkali) soils

Source: Farm Management Handbook of Kenya.

7. Unfortunately a major feature of the predominant soils is that they are usually less than ideal for cropping. Low fertility is common. Whilst this may not be a limiting factor under shifting cultivation, which depends on the ephemeral fertility built-up during the bush fallow phase it leads to the necessity to incorporate organic matter and/or to integrate crop and stock management if permanent farming is attempted. This is especially so in the ASAL areas where anticipated yield levels and inter-seasonal variations will normally preclude the use of purchased fertilizer at least in the absence of supplementary moisture. Soil units with higher fertility in the ASAL area are normally those with a higher clay or silt content. They are difficult to work and may suffer from salinity or sodicity to a varying extent. The dominant characteristics of the major soil unit in Kenya are shown in end Table 3.

8. An approximate overview of the distribution of the main soil units is.

<u>AREA</u>	<u>SOIL UNITS</u>
East of a North South line Kilifi/Moyale	Solonetz Vertisol
Coast from the Tana River to the Tanzania Border	Ferralsols Cambisols Arenosols
Kilifi/Moyale line to Athi River and North to Tana River	Ferralsols Luvisols Acrisols
Rift Valley floor	Solonchaks
Remainder of Northern Kenya	Xerosols Arenosols Solonetz

9. Within ASAL zones V-VII permanent cultivation is mainly associated with the ferralsols, luvisols and acrisols of agro-ecological zones V in the lower midlands of the piedmont areas of the central massif of Kenya, and with ferralsols, acrisols, cambisols and luvisols elsewhere although better soils such a fluvisols are used when there is an opportunity.

10. Soils selected for permanent cropping are invariably deep, sandy loams to loams, but initial characteristics have to a large extent been lost through erosion and inappropriate husbandry. True vertisols appear to be avoided except possibly in particular circumstances where flood recession farming is practised (not checked). Fertility amendment with fertilizers is not practised but in certain areas, particularly Machakos and Kitui boma manure is applied. In areas which have been improved water infiltration is encouraged through bench terracing (fanya juu), and cultivation is on the contour, particularly where ox cultivation is widely practised. Elsewhere trash lines are common but are rarely of sufficient density to be effective. Moisture enhancement through one of the several methods available (see below) is not widely practised with the exception that in improved areas cut off drains which are used to prevent excess run-off from reaching the fields are constructed without an outlet and are used for water and silt collection prior to planting economic trees. Use may also be made of run-off water from roads and similar structures. Minimum tillage particularly in association with shifting cultivation is practiced in some areas.

11. Moisture availability and holding capacity of the soils is the key to successful cropping in the marginal areas. As a rule of thumb the guidelines in Table 4 apply:

Table 4

Generalized Soil Moisture Availability		
Texture	Infiltration rate mm/m	Total available moisture cm/m
Sandy	50	8.5
Sandy loam	25	12
Loam	12.5	17
Clay loam	7.5	19
Silty clay	2.5	21
Clay	5.0	22.5

12. Most of the soils presently cultivated in ASAL zone V fall in the lower range, i.e. sandy loam, but run-off potential is high especially when soils are denuded and/or compacted, a common occurrence because of overgrazing. Infiltration rates are moderate to good when water is impounded and stored moisture available for plant growth is reasonable.

13. In ASAL zone V shifting cultivation is practised whilst in zones V and VII chance cropping following flooding is used to a limited extent in clay loam and silty clay soils which have relatively high available moisture for plant growth. The soils which are used may be sodic and alkaline to some extent requiring tolerant crops, normally sorghum. Fluvisols may also be used locally and may support agriculturalists who farm behind river levees on the receding flood eg. the Pokomo, near the Tana River.

#### Topography and Drainage

14. Zones VI and VII of the ASAL areas are generally gently undulating plains which are at increasing altitude and become more hilly and dissected, at the transition to Zone V, as they approach the highland massif. Within the plains there are occasional hilly areas. The margins of the rift valley are associated with steep scarps but elsewhere the rise to the highland massif whilst hilly, is cultivable, provided suitable soil conservation is applied.

15. There are four major drainage systems within the area. The Athi/Tsavo/Galana river system rising in the Aberdare Mountains and Mt. Kilimanjaro and running SE to E to the Indian Ocean; Tana river rising in the Aberdare Mountains and Mt. Kenya and running East and then South to the Indian Ocean; the Ewaso Ngiro river running North from the Aberdare Mountains and Mt. Kenya then East and finally South East to the Lorian swamp and the Turkwell and Kerio Rivers which flow North to Lake Turkana.

16. Within these systems there are a number of mainly seasonal tributaries and streams with high intensity spate flows.

17. Despite the low rainfall and generally flat conditions considerable run-off is generated in the ASAL areas, as a result of high intensity storms which occur and the generally denuded and capped soil conditions. Conditions are generally good for water harvesting. Although care needs to be exercised in site selection to ensure that excess water at high speed is avoided. Drainage conditions in the area also lead to a fair degree of siltation although this can be turned to advantage when used for sub-surface or sand dams, it may present problems in suitable structure design for water harvesting for cropping.

#### Land Use

18. The ASAL areas are used predominantly for livestock production. However cropping is practised at least to some extent by a majority of the population, often to assist recovery from severe drought or animal disease which has reduced herd/flock size through death or sale and consequently milk and meat supply. Cropping assumes greatest importance in AEZ V, associated with greater population density which existed initially because higher stock densities were possible. Population density is reported to be increasing because of encroachment by cultivators from adjacent better watered areas and/or government settlement programmes.

19. Reliable statistics are not readily available to quantify the extent of the cropped area or to demonstrate that cropping is an increasingly important form of land use in ASAL 1/. Nevertheless there are general reports that increases in cropping and stock density have degraded the resource necessitating remedial action. Whilst this applies particularly to livestock feed where browse is replacing grazing, leading to the replacement of cattle by goats it also applies to the cropped area. Where continuous cropping has replaced traditional shifting cultivation, erosion has increased to the point where soil conservation, which has an important moisture conservation spin off, is being encouraged to control sheet erosion and gullying. Similarly tree cover in these areas is much reduced and tree planting programmes are being implemented to the extent possible. Degradation is most noticeable in the hilly margins (AEZ V) of the ASAL but it is also present in the undulating lowlands where sheet erosion is a major phenomenon.

#### Cropping

20. Regular cropping is practised to some extent in AEZ V and possibly VI especially in areas such as Machakos, Kitui, Taita Taveta, Kwale, Kilifi, but over much of these zones shifting cultivation is still the norm. In areas such as Turkana, Samburu, Marsabit and Moyale there is limited cropping in low lying areas.

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1/ Estimated crop statistics for sorghum and millet 1970-1977 are in end Tables 5a and b, and for sorghum, millet, roots and legumes in end table 6.

21. Small farm surveys have not been systematically carried out in AEZ V, VI or VII. The limited information that there is recorded in the better wading watered areas of AEZ V. It suggests that in these areas maize, either in single or mixed stand remains the major cereal crop grown. In lower rainfall areas millets are grown East of the Rift Valley and sorghum to the West. Finger millet is grown in selected sites with higher fertility generally subject to shifting cultivation.

22. Cassava and to a lesser extent sweet potatoes are used as supplementary energy sources. Cassava has limited popularity at the Coast and in Eastern Province whilst sweet potatoes are mainly used in Eastern Province.

23. Amongst the legumes beans (phaseolus) are used where possible, but are substituted by cowpeas, green grams, pigeon peas and, where soils permit, groundnuts as conditions become warmer and drier.

#### Varieties

24. Throughout the ASAL indigenous varieties are mainly used. However improved crop varieties are available which are certainly suitable for much of AEZ V and for some parts of AEZ VI. Research over the years at Katumani Research station and at outstations in the ASAL areas has either selected or proven adaptation of short duration maize (Katumani and Dryland Composite) early maturing bullrush millet (both awned and awnless), sorghum proso millet and foxtail millet. Appendix 1 gives details of sorghum, and millet recommendations available in 1983, and a general description of breeding objectives. Varietal recommendations are also available for grams (black and green) early maturing cowpeas, pigeon peas and several other legumes. Eastern Kenya and the coast have received more attention than elsewhere, but ongoing donor-assisted ASAL projects have refined recommendations through local trials (end Table 7).

25. Whilst varietal recommendations are, by and large, in place seed supplies, with the exception of maize remain problematic, except in areas where ASAL projects have sponsored seed production.

26. Similarly local farmers have received little exposure to the new varieties which are available, except where ASAL projects have supported extension in the marginal areas. It is a moot point however whether the recommended varieties will be of particular interest in the absence of improved production conditions, starting with an improved moisture supply. Exceptions occur where the growth cycle of the recommended variety is suited better than that of local varieties to the prevailing growing conditions or where they exhibit better natural resistance to pests, diseases or birds. Early maturing maize is proving acceptable and there is a reported increase in the area of early maturing legumes. On the other hand sorghum which may often be better suited to the prevailing conditions is rejected to a great extent because despite the yield security which it would provide it requires more labour to produce and prepare and has market price disadvantages.

#### Crop Yields

27. Crop yield estimates for the ASAL areas are difficult to obtain. In part this is because yields vary between seasons, between years and between crop mixtures, and in part because the farmed area is dispersed. Yields for AEZ IV under present and improved farming conditions are shown in Table 10.

Table 8

Crop	Yield kg per hectare		Improved Variety
	(Present)	(Improved) a/	
Maize	400-700	1000 - 1800	Katumani
Beans	300-500	800 - 1500	1576
Pigeon Pea	200-400	500 - 800	Serere
Cowpea	300-500	600 - 1000	Katumani MM
Green Gram	200-300	400 - 600	M66,K80
Sorghum	800-1200	1000 - 1500	early maturing
Bullrush millet	800-1500	1200 - 2000	No. 26

Source: Dryland Farming Resereach and Development Project.

a/ FYM, improved varieties, seed dressing, early planting, and planting at in rows 75 cm apart.

28. Existing and potential yields in the true ASAL areas (AEZ V-VII) are much lower on average than those quoted above. Table 9 obtained from results of the Baringo project demonstrates the point.

Table 9

Yields of Cereal Crops<sup>a/</sup> in BPSAAP Area Under Traditional and Improved Systems for Various Zones and Different Rainfall Regimes (Kg/ha/Season)

Zone	Good Rainfall Yr. (1 in 5 years)		Avg. Rainfall Yr. (2 in 5 yrs.)		Poor Rainfall Yr. (2 in 5 yrs.)	
	System		System		System	
	Trad.	Improv.	Trad.	Improv.	Trad.	Improv.
Irrigated <u>b/</u>	2000	3500	1500	3000	1000	1500
Lowland	1000	1500	250	750	0	250
Medium Alt.	1500	2000	500	1000	0	250
Tugen Foot-hills	750	1000	400	600	0	250

a/ probably maize

b/ probably spate irrigation.

29. Mixed stands have been demonstrated to give a yield advantage when compared with pure stands. The advantage at least in cereal mixtures is in large part due to differential tolerance to drought. This has led to recommendation by Katumani Dryland Research Station of varying mixtures dependent on length of growing season. The recommendations which at least for the Eastern Province of Kenya include fallow are shown in Table 10.

Table 10

Guide to Optimum Cereal Crop and Rotation Eastern Province

AEZ	IGS <u>a/</u>	Cereal Mix %			
		Maize	Sorghum	Millet	Fallow
IV	70 - 80	80	20	-	-
	60 - 70	< 75	25	-	< 10
V	50 - 60	< 50	50	< 5	10 - 15
	40 - 50	< 35	70	< 15	15 - 20
	30 - 40	< 25	75	< 25	20 - 25
	< 30	< 20	75	< 50	25 - 50

a/ IGS - Length Growing Season.

30. Incorporation of fallow with the system is one way of improving moisture availability. Another moisture concentration method was used in Baringo. The effect of water harvesting on sorghum yields is shown in Table 11.

Table 11

The effect of Water Harvesting on Sorghum Yields

Site	Year	Ratio Catchment: cultivated area	-----Yield kg/ha-----	
			Treatment	Control
<u>Internal Catchment</u> i.e. within the cultivated area				
Katorin (AEZ ?)	1982	2:1	775	135
	1983	1:1	540	10
<u>External Catchment</u> i.e. outside the cultivated area				
Marigat (AEZ V)	1982	20:1	480 <u>a/</u>	n/a
	1983	20:1	1275	n/a

a/ Bund breakage reported.

Unfortunately rainfall data are not available but yield increases appear spectacular even at 1:1 catchment: cultivated area ratio.

31. Yields with different methods of water harvesting in trial at Katorin in 1981 gave the following results.

Table 12

Yields of Sorghum and Cowpeas  
using Several Water Harvesting Techniques

Treatment	Kg/ha of Serena Sorghum		Kg/ha of Cowpeas
	First Harvest	Ratoon	
Impounded plot (deep tillage)	420	595	70
Impounded plot (zero tillage)	120	n/a	n/a
3 m contour bunds	410	430	155
Hoops (zero tillage)	410	900	130
Control plot (deep tillage)	60	325	20

32. Water harvesting appears to have had a very positive effect on yield except in the case of the impounded plot without tillage. The hoops are reported to have given very uneven crop growth, nevertheless, the result is excellent.

33. Workers in Kitui, compared yields using contour ridges, external catchments, Fanya Juu terracing with a control without structures. Three seasons results are shown in end Table 13. The results are inconclusive but there are indications that at the three sites chosen at least one of which is in AEZ V there is generally a small advantage to water harvesting.

34. The evidence available suggests that present yields in AEZ V are less than 1/2 ton of mixed stand crop on average. Provided fertile soils are selected, or FYM is used provision of extra moisture is capable of giving yield increases of at least 50% but more probably 100% on average.

35. Provided appropriately designed water harvesting systems are selected similar yields and probabilities should apply in AEZ VI. In AEZ VII no yield increases are likely but water harvesting structures could be used to increase the area available for cropping.

36. The desirability of improving moisture availability is demonstrated in end Table 14 which examines the danger of famine due to crop failure in Kitui District AEZ V.

Pests

37. The insect pests prevalent on various legume crops grown in the ASAL areas are tabulated below:



Table 15

	Beans	Lablab	Cowpeas	Pigeon Pea	Grams
Beanfly	x				x
American Bollworm		x	x	x	x
Bean aphid	x	x	x	x	x
Bean Bruchid		x	x		
Nematodes		x			
Pod borers			x	x	
Blossom beetles				x	
Thrips			x		x
Pod suckers					x

38. Insect problems also occur with legumes in store particularly cowpea. It is not clear to what extent control regimes have been tested and whether or not they are economic at prevailing yield levels in ASAL (about 300-600 kg per ha).

39. Similarly sorghum is attacked by shootfly, stem borers, American bollworm and sorghum midge. The major pest however is birds for which the only effective control at farm level is scaring.

40. Farmer control of in field insects is rare but control in store with both chemicals and ash is reported for some crops, especially maize and the legumes. Given the adaptation of legumes to the ASAL areas because of their short cycle, relative drought tolerance, their use in mixed cropping and suitability for relay or rotational cropping further consideration of the possibilities of financially attractive in field insect control is merited. Improved storage and insect control may also prove attractive if longer-term storage enables farmers to avoid early marketing of their crops and thus obtain more attractive prices.

#### Cropping practices and labour demand

41. Land preparation is mainly carried out by hand using local tools but oxen are used by a limited number of ASAL farmers. Ox cultivation is particularly popular in Eastern Province eg. Kitui. Throughout ASAL ox cultivation is being encouraged by the Technology Development Unit of MALD. Crops are normally planted in mixed stand and may be weeded once or twice depending on the length of the season. Weeding is apparently carried out late when weeds are 15 cm high. Harvesting is by hand and threshing is by manual beating normally in the harvest field. In Eastern Kenya, certain crops, such as pigeon pea and traditional sorghum are planted in the second rainy season to be harvested at the end of the first rainy season of the following year.

42. Fertilizers are little used and so surprisingly is animal manure the latter being attributed by some to lack of transport.

43. Labour input of between 150 - 250 man days per season per ha can be anticipated for traditional cropping with a possible labour conflict during land preparation which coincides with the period of maximum herding, as feed and water supplies are extremely short, and maximum household water

shortage. Timing of the labour input will vary from East to West of the Rift valley as cropping situations change. End Table 16 breaks down labour use by task and month for two situations in each of Embu and Kitui Districts. Major differences occur in time use per ha due to ox cultivation which reduces land preparation time in Kitui and guarding or bird scaring which increases labour demand considerably. Double cropping combined with the choice of sorghum leads to a very full agricultural calendar with a particularly heavy workload in January and June in Embu, mainly due to bird scaring. Workloads are very heavy throughout the first 6 months of the year in Kitui. Nevertheless, the figures appear to indicate labour surplus except in June/July in Embu for household tasks and to earn off-farm income. The breakdown between male and female tasks was not attempted in the survey. Neither is it clear to what extent additional labour would be available for construction of water harvesting structures. However, it could be postulated that provided such structures show a rate of return similar to that available from off-farm work the labour could be found. The extent of cropping in each season probably depends on the previous harvest. Labour load is also spread to some extent by planting double season crops such as pigeon peas and sorghum.

#### Land Tenure

44. Land adjudication is proceeding throughout the ASAL areas. In the process of this exercise it is reported that a number of farmers/pastoralists are being marginalized as the size holding to which they can claim ownership is insufficient to support their livestock holdings and in some cases to make a living from agriculture. In practice what appears to happen is that grazing lands remain common to a great extent, whilst crop lands are respected as they always were. In general, however, adjudication should give farm families more security to carry out improvement works especially on the crop land.

#### Experience with Water Harvesting in Kenya

45. Formalization of water harvesting in Kenya has a long and somewhat chequered history which includes:

- Spate irrigation (also called water spreading), the construction of diversion weirs with associated terracing to control flow of the diverted water from seasonal rivers which flow ephemerally after rain. Experience in Turkana in the 50s, 60s and 80s confirms that the system is technically practicable given correct site selection and management. Work continues in Turkana but good management by the pastoralist population has proved elusive so far. Interestingly the system is not recorded as attempted in other areas of Kenya, where cultivation is more widely accepted e.g. Kitui.
- Run-off harvesting, the collection of run-off water to provide supplementary water for crop, stock and domestic purposes. Whilst run-off harvesting for stock and domestic purposes has a history of some 90 years in Kenya the use of formalized run-off water harvesting for crops is much more recent. Again much of the experience is in Turkana, where intermittent precipitation has been concentrated to supply bunding arrangements (semi-circular hoops, trapezoidal and contour bunds) for crop, including pasture and tree, production. This is an adaptation to local agricultural practice in which crops are planted on areas which are naturally inundated once the flood has receded. The aim of the structures is

to replicate these conditions artificially. There is continuing debate on the most appropriate structures and whilst documentation on acceptability and performance is scant there are reports of some local acceptance of trapezoidal bunds where these are constructed, after consultation with the local people, to a robust and (almost) maintenance free design. Technically the system works with yields of 1 ton of Turkana sorghum per hectare reported. Trapezoidal bunds appear to fit well with the requirements of the local people, who are transhumant in the main and make their living from livestock, in that they provide a resource which can be cropped when need arises and adequate rainfall is received. Bunds are sufficiently large in volume to allow planting on the receding flood (inundation) which is the traditional cropping method in the area. The main disadvantage of the trapezoidal bunds is that they are massive and require a large labour input or mechanical assistance for their construction.

- Other recent experience is in Baringo and Kitui in areas of better precipitation which are still marginal for crop production in most years. Because catchment to planted area ratios are of the order of 2:1 to 4:1 realistic choice can be made between in-field and external catchment areas. In-field catchment requires reorganization of plant distribution along an intermittent ridge and furrow system with the wide inter-row left uncultivated, whereas external catchment builds on local run-off harvesting ideas by formalizing water control within the field through a series of contour bunds either designed to syrup pan or provided with spillways.
- Experience in Baringo led to the tentative conclusion that in-field systems were technically preferable but met farmer resistance because of the apparent waste of land caused by the unplanted area. In fact plant populations remained similar but the visual effect was disuasive. In view of this external catchments were (reluctantly) promoted with very slow uptake reported initially. In fact experience elsewhere, Somalia, Sudan, Burkina Faso for example, indicates that farmers show preference for structures rather than agronomic rearrangement in field perhaps because it allows them to continue to use the land traditionally, and because it avoids additional in-field work. In fact total labour requirements may be similar as illustrated in end Table 17 below.

Table 17

Work Rates for Various Runoff Harvesting and Terracing Systems a/

Man-days b/ per hectare/per year

	First Year			Subsequent Years (maintenance, recurrent activities)		
	Tillage	Structures	Cut-off drain	Tillage	Structures	Cut-off drain
Deep Tillage	50	-	-	50	-	-
Contour Ridges	-	32	60	-	32	20
External Catchment Systems	50	100	-	50	30	-
Fanya-Juu	50	320	100	50	60	30
Terracing c/						

Notes:

- (a) Cut-off drain usually, though not always, required in contour ridge system.
- (b) Man-days refer to a 4 hour day.
- (c) Fanya-Juu terracing figures based on a typical stony slope of 20% in BPSAAP area.

Source: Based on figures generated by BPSAAP

The Influence of Water Harvesting on Crop Choice

46. The following theoretical calculation is intended to demonstrate how enhanced moisture availability can influence crop and variety choice.

47. In certain conditions such as are experienced in zone VI, there is no true cropping season because the length of the agro-humid period is too short but a crop of proso millet may be obtained (see Chart 1). The example of Nginyang in Baringo district can be used to illustrate the possibility of improving cropping possibilities if moisture is concentrated. The area has a 60% probability of 135 mm of rainfall in 150 days. For a 90 day crop of sorghum the ETC would amount to about 350 mm. A catchment to planted area ratio of 10:1, with 30% runoff and 120 mm moisture storage capacity is assumed. The following table demonstrates moisture availability for a 90 day crop of sorghum planted in mid-June. Early precipitation is used to work the soil and for storage.

Table 18

Theoretical Moisture Concentration and Storage Nginyang assuming Catchment  
to Planted Area of 10:1 and 30% run-off

	90 days sorghum														
Decade	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Rainfall	10	12	15	5	5	-	5	5	15	25	7	15	20	2	4
Run on	30	36	45	15	15	-	15	15	45	75	21	45	60	6	12
Total	40	48	60	20	20	-	20	20	60	100	28	60	80	8	16
ETO/ETC	16	16	16	16	16	16	16	19	28	42	46	52	52	52	42
Stored moisture	24	56	100	104	108	92	96	100	132	190	172	180	208	162	136

48. It will be noted that in the example chosen there is more than adequate moisture for the sorghum crop, and adequate time to take a short-term crop of proso millet before planting the sorghum. However, except in above-average years, the millet would suffer moisture deficit prior to harvest and there would be no stored moisture available at the start of sorghum crop.

49. The above scenario indicates that in an area previously marginally suited for millet, a full stand of sorghum could be planted, that substitution with a 90-day maize would be possible, and that either crop could be supplemented by relay cropping with a 60-day cowpea or could be preceded by proso millet. Alternatively the catchment to planted area ratio could be reduced to about 5:1 to provide a secure crop of sorghum in six years out of ten.

50. Perhaps one of the major advantages of exploiting run-off in situations where the crop season can be made to exceed 90 days is that maize which is stated to be the cereal of preference for many people now farming the marginal areas can be substituted, at least partially, for sorghum or millet - the cereals which are normally suited to the zone.

51. In the theoretical example worked above a catchment ratio of 10:1 was selected but this could in fact be reduced to 5:1 to support a single crop. A 5:1 catchment/cropped area ratio may be preferable. This is because run-off water is more manageable in smaller quantities and structures are less expensive and require less design. A further important reason is that small catchments are more efficient than large ones i.e. the run-off which is generated is a higher percentage of the precipitation.

52. Another point which should be noted in the example is that run-off has been assumed even when the decadal precipitation is less than 5 mm. This is a dubious assumption. Work in Baringo under the BPSAAP project has shown that 8 mm of precipitation is required before run-off is generated. The figure will vary according to the mechanical characteristics of the soil, the slope and rainfall intensity. In general, compact soils with low infiltration rates, increasing slope in the catchment area and high intensity storms will each tend to reduce the amount of precipitation required to initiate run-off.

### III. EXISTING SUPPORT SERVICES FOR AGRICULTURE IN ASAL

53. Government support to agriculture is provided by the Ministry of Agriculture and the Ministry of Livestock Development. These two ministries have been created by a very recent division of the Ministry of Agriculture and Livestock Development. The details of the subdivision had not been published at the time the mission left Nairobi, and consequently it is only possible to discuss the arrangements which existed prior to the split.

#### Agricultural Extension

54. The Agricultural Extension Services Division has received multi-lateral donor support for a National Extension Project (NEP) which covers the medium and high potential areas of the country, AEZ IV and above and is organized on T&V principles. The ASAL areas are heavily staffed with technicians and junior technicians in all but the pastoral districts. ASAL districts have officially only been brought under the new extension arrangements being promoted under NEP where funding is provided by a bilateral area specific ASAL Project eg. Machakos, but some ASAL areas are unofficially covered by NEP. It is of interest that NEP was established during a previous period when agriculture and livestock fell under separate ministries and for this reason livestock packages were originally omitted. Subsequently livestock was incorporated. It is also of interest that AEZ IV is now classed as medium potential and included under NEP. There are five main extension themes: crop production, animal production, soil conservation, home economics and rural youth and farm management. Among the themes crop production is reported to be covered best followed by soil conservation. Themes which are reported not adequately covered by the programme are home economics, farm management, range management and to a lesser extent animal production. However overall NEP is reported as working well with both Government and Funding Agencies well satisfied with the results.

55. There is no coherent extension policy for the ASAL areas at present except for support provided to irrigation schemes. From the viewpoint of ASAL development it is important to appreciate that at district level NEP uses the major part of the senior manpower resources available to the DAO. Subject matter specialists operate at district and divisional level in support of the system. The implication is that further technical staff will need to be available to backstop ASAL programmes at District and Division level, but that once appropriate interventions are designed field staff are probably available (staff numbers could not be obtained by the mission).

#### Soil and Water Conservation Services (SWCS)

56. SWCS fall under the Land Resources Development Division and have been supported by a bilateral assistance programme (SIDA) since 1974. The high potential areas defined as zones IV and better in 39 districts are covered. In addition, the construction of cut-off drains, fanya juu terracing and gully control have been promoted by the area-based ASAL projects. These activities which are mainly in AEZ IV are often promoted

using a cadre of temporary staff as access to TA's or JTA's has not apparently been incorporated into project design. For the moment water harvesting for crop production is neglected except in association with soil conservation programmes in a limited number of ASAL projects e.g. Turkana, Kitui and Baringo. Assistance with soil and water conservation is also being provided by a number of NGO's.

57. SWCS has three sections at headquarters: Training and Extension; Monitoring and Evaluation and Agroforestry. It is represented by a soil conservation officer at Provincial and at District level. Field work is carried out by TAs as part of the district extension activities. Under an agreement with the extension services thirty-five percent of their available time is allocated to soil conservation activities. In 1984/85 the last year for which information is published 97,042 farms were terraced, 2.6 million metres of cut-off drains and 162,000 metres of artificial water way constructed. 676 gullies were controlled, 135 pieces of eroded land rehabilitated and 15,200 km of river bank protected.

58. In addition to other activities some 2.7 million tree seedlings were distributed about 10% of which were fruit trees. The trees are produced in nurseries in cooperation with prisons, farmers training centres, irrigation schemes, etc. under programmes organised at the district level. SWCS' inputs include seeds, polybags and budding knives. There is active cooperation with the National Horticultural Research Station for technical advice and training in nursery techniques.

59. Training activities include seminars and training for in-service staff; training for chiefs and subchiefs; farmer training. Soil conservation workshops and tours are also organized from time to time.

60. The soil conservation programme in Kenya has had spectacular success in the higher rainfall and higher potential areas. Soil conservation activities in general are sponsored and actively supported by H.E. the President. In the marginal areas much good work has also been done by the ASAL projects, but it is generally not integrated fully into the overall SWCS programme. Technicians are hired on a temporary basis. To some extent the donor programmes are innovative using alternative methodology such as trash lines and as previously explained a start has been made with moisture harvesting, but to date no continuing government programme is being developed to carry the ideas forward. SIDA has expressed interest in trying to build moisture harvesting into the SWCS programme but the number of Kenyans with skills in this area appears to be a constraint at the moment.

#### Mechanization and Rural Technology Development Branch

61. The Agricultural Mechanization Services (AMS) of MOA include the Heavy Machinery Services and Farm Mechanization Services. The latter is being run down in favour of privatization and is of little interest in ASAL. The former whilst operating considerably under capacity at present because of reported budgetary constraints was considerably strengthened at the beginning of the ASAL programme in 1981 by opening 12 new stations. There are 19 Agricultural Mechanization Stations in operation today. Details are shown in end table 19.

62. Work completed in 1985 included four dams, 320 water holes (< 1 million gallons capacity), 28 km of farm roads, 28 km terraces, 250 ha of bush clearing. Problems encountered included underfinancing, slow repair work, difficult procurement procedure for spares. Within the district AMS,

stations fall under the supervision of the DAO, however each station has a manager and staff who are responsible for their management, meeting demands for work, collecting charges, etc.

63. The future of the mechanization of services is under review at present. Conversion to a parastatal organization has been considered but no final decision has been made. It is clear that heavy machinery services can play an important role in land development programmes especially in areas subject to major labour constraints and or where soils are heavily compacted. In view of budgetary constraints government policy on the cost, organization and management of such services should be reviewed to find a least cost alternative to providing an effective service.

64. Rural Technology development programmes include promotion of improved storage in maize growing areas. The extent to which similar activities are carried out in the ASAL areas is unknown but improved storage was popularly promoted in Baringo under BPSAAP.

65. Other programmes of the RTU include promotion of new farm implements and the use of oxen. The implement programme originally supported by FAO has developed a lightweight plough, a hand weeder and a weeder conversion for the victory plough which has been successfully demonstrated by the Kitui ASAL Project. The unit faces considerable difficulty in marketing these ideas in part because of procurement delays in obtaining an initial batch of equipment for extensive demonstration and sale.

#### Agricultural Research

66. Research is being reorganized in Kenya by incorporation of the Kenya Agricultural Research Institute (KARI) and the Research Division MOA into a single parastatal organization under KARI. The development will be assisted by a National Agricultural Research Project with multi-donor support. Under this proposal dryland farming research appropriate for the ASAL areas would be covered under a core soil and water management subproject and support for the Katumani regional station. The soil and water management subproject is estimated to cost about Ksh 7 million over five years. Sorghum, millet and grain legumes may be expected to receive priority attention, among the crops for the ASAL areas.

67. There has been considerable input already into dryland research dating back to the 50s when the Katumani station was established. Programmes have centred around varietal development and selection but agronomic proposals have also been developed. As an example for sorghum in Zone V: the advantages to producing crop using enhanced soil moisture (in this case through fallowing) have been demonstrated both experimentally and on-farm; plant density recommendations are available, security aspects of widerow cropping providing plant density is maintained have been demonstrated, trigger dates for dry planting have been established (for Eastern Province at least). For millet plant density recommendations for several soil and altitude zones have been initially defined and possibilities for intercropping have been examined.

68. It is probable that between recent and historic work at Katumani there is an adequate range of research results to support marginal improvements in crop production in AEZ V and VI in Eastern Kenya. However the most convincing results which have been obtained concern maize. Research



remains with the important task of convincing the remainder of the Ministry of Agriculture that it has made a significant start towards resolving the crop production problems of the ASAL areas.

#### IV. OPPORTUNITIES AND CONSTRAINTS TO INCREASED AGRICULTURAL PRODUCTION IN ASAL

69. The increase of population of the ASAL areas provides a major opportunity to initiate agricultural change but in the absence of change it is degrading the resource. Pressure on the marginal resources leaves families in a position where they have to make choices between improving the resource, generating additional income locally or migrating to seek employment. As is reported elsewhere (Annex 10) the last two which may be classified together as off-farm income is a major contributor to family income especially in the more densely populated areas.

70. In areas where rainfall is more or less adequate for crop production  $r/EO > 40\%$  bench terracing of the arable crop land is popular as it effectively conserves moisture in situ as well as ensuring soil conservation. Other improvement measures such as pasture improvement and tree planting are proving more difficult to promote with the exception that terrace stabilization and fruit tree planting appear to be appreciated. Integration of animals into the farming system is also proving difficult, probably because animal holdings are larger than the farm area can support and common grazing of the declining resource is still practised to a great extent. However there are signs that farmyard manure is being increasingly used in some areas by certain groupings eg. the Akamba. In the moderately productive areas NEP is reporting considerable success especially with its crop programmes.

71. Experience in the marginal, and perennially arid areas (AEZ V, VI and VII) has been less positive so far despite the efforts of a number of area specific projects which have demonstrated alternative methods of soil and moisture conservation, including both water harvesting and improved crop husbandry. The explanation commonly offered is that the people are pastoralists first and cultivators only in times of difficulty. The stage is being reached in many areas for the many families who have few livestock where difficult times are more or less permanent. The extent of cultivation is reported to be increasing but the chances of getting a reasonable crop, remain as they have been historically in the absence of actions to ameliorate the environmental effect through either husbandry or engineering intervention, both of which are technically possible.

72. To date, the indifferent to unsuitable rainfall regimes appear to have mitigated against crop improvement based on varietal change and improved in-field agronomy even in the relatively small part of the ASAL where people have traditionally cropped normally using shifting cultivation. Research results are available which can improve the security of food cropping but they have not been demonstrated convincingly to planners, extensionists and farmers. Cash crops are only available to some extent. Some, such as oil seeds, have indifferent yields which make them unattractive. The exceptions are legumes particularly cowpea, green gram and short duration pigeon pea which are suited to the conditions, have a

beneficial effect in rotational or mixed cropping systems, and enjoy a good market. Perennial crops which should be agronomically better suited are either marginal eg. sisal, suffer poor markets eg. castor or are unproven eg. Jojoba.

73. The overall marginality of the situation is due primarily to insufficient crop moisture exacerbated by large fluctuations between years and seasons. To overcome this irrigation schemes have been implemented in the ASAL areas. Whilst some of the irrigation schemes provide assistance to existing irrigators or farmers others have been designed in areas where predominantly pastoralist populations live who adopt simple cropping when the need arises. Lessons learned from these schemes indicate that low cost interventions to improve traditional irrigation schemes are very successful, provided they do not necessitate changes to the cropping pattern to pay for increased running or maintenance costs. That is the schemes continue to be used for the purpose for which they were developed, subsistence cropping. Experience with the other schemes is mixed, problems have been various but progressive solutions ranging from initial low cost high maintenance approaches were superseded by high cost, high maintenance but have now reverted to the former to a great extent. The lessons appear to be that schemes have to be manageable within local available labour resources and that subsistence cropping should be the objective.

74. Spate irrigation (water spreading) uses a similar approach to the irrigation schemes except that water is diverted from ephemeral streams when they run. High labour input maintenance is associated with these schemes. The approach has only been tried in pastoralist areas whereas it may well be better suited to areas where agricultural people are being forced to farm marginal conditions intensively. Technically the idea works. Subsistence crops and/or pastures can benefit but a fixed agriculturally oriented population is required to provide maintenance.

75. Soil moisture enhancement through water harvesting has been attempted in pastoral, semi-pastoral and to a lesser extent agricultural areas. In both pastoral and semi-pastoral areas the final approach has been to design systems that involve construction with as little additional in-field work as possible during the crop season. This approach has the advantage of allowing people to continue to crop traditionally within the structure. It is complementary to informal systems which are already used. In the pastoral areas a feature of the design is oversizing to reduce maintenance to a minimum. Some uptake is reported in the three districts (Turkana, Baringo, Kitui) where structures for water harvesting have been tried. The ideas which have been initiated would appear to be worth developing and given more publicity and exposure.

76. In the semi-pastoral and agricultural areas the water harvesting systems have been used include fallows, and management of plant spatial distribution initially without ridging and subsequently with tied ridging to increase efficacy. All the concepts work technically. However, they are resisted at least initially by farmers because of what they view as wasted space within the field. Spatial distribution with ridging is also resisted because of claimed increased work during land preparation and the difficulty of weeding crops planted on sloping furrow sides. Nevertheless work should be continued to try to adapt these efficient and low cost solutions which are suited of much of AEZ V, to the needs of the farmer and to develop methods of tied ridge construction using ox equipment where appropriate.

77. If structures are to be used for moisture conservation/enhancement the poor soil fertility conditions encountered over much of the ASAL area must be taken into account. Shifting cultivation or informal fallows are practised traditionally to exploit ephemeral soil fertility. With increased cultivation the opportunity to continue these practices disappears or their efficacy is greatly reduced because of the short break which is possible. Continuation of fallow systems would increase the effective cost of structures per cropped hectare if the whole cropped area were covered by water harvesting structures. In the long-term this may be supportable if the production of fallow area can be increased by planting pasture, forage or browse. In the short-term it would be better to promote the use of FYM to enhance fertility and improve moisture retention capacity in a permanently cropped area. This action is probably dependent on encouraging farmers to paddock their animals on arable fields over night or on hauling FYM from bomas near the house compound, implying the need to introduce pack animals or draught animals with sledges or carts. Future action which may be taken includes the introduction of useful forage/shade tree species, some fast growing such as Prosopis sp, and some slower growing such as Acacia tortilis.

78. In summary it is felt that water is the key to meeting the increased subsistence requirements of ASAL households. Soil moisture improvement systems should be primarily used to increase subsistence crop production. Whilst it is possible to design agronomic measures to ensure maximum water retention and storage from one season to the next structures are likely to have a greater and faster impact. The implementation of a water harvesting programme will use the available capacity of MOA at field level and should not be complicated unduly initially. The major complimentary activity to be encouraged should be the application of organic material, mainly FYM. Other possibilities for crop improvement such as early land preparation, improved seeds, weeding and for crop preservation (improved storage) should be strategically introduced as the production base is improved.

#### V. AGRICULTURAL DEVELOPMENT OPTIONS

79. In the opinion of the mission three possible production-oriented agricultural development options are available for the ASAL areas.

- Soil moisture and fertility improvement.
- Extension including improved crop husbandry crop storage development and mixed farming; and
- Seed production.

80. The above can be seen as components of an overall extension programme. However clear disaggregation is necessary. It appears unlikely that little more than expansion of the planted area can be expected in the absence of soil moisture improvement. It has been argued in the previous section that promotion of improved crop husbandry has not been very successful historically and that there is little incentive to develop mixed farming which still remains elusive even in AEZ IV which has medium potential. Seed production is ongoing to some extent and is only likely to

become a major priority as growing systems are improved. Longer-term on-farm storage improvement should follow production increases. The development possibilities are sequential and all depend on improved, more secure growing conditions for their implementation. There is another major reason why soil moisture and fertility improvement should be viewed initially as a separate option and this is organizational.

81. The SWCS MOA has no capacity at present to carry out soil or moisture conservation programmes in the ASAL areas and this applies at headquarters, Provinces and Districts down to the grass roots level. SWCS programmes for ASAL cannot be viewed as an expansion of existing activities which stop short at bench terracing (fanya juu). This is because sustained production in poor rainfall situations can only be expected if moisture is concentrated for plant production rather than being held in situ. Principles and concepts associated with water harvesting and water spreading will need to be applied. Staff capacity will need to be developed. At the implementation level District teams should be established to assist with the survey and layout of small schemes which will be implemented by field level technicians. At the field level technicians should be trained and should concentrate the major part of their time to moisture conservation activities.

#### Soil Moisture and Fertility Improvement

82. The objective of this programme would be to demonstrate options for increasing available soil moisture in various climatic, soil and social conditions. To adjust design to meet local needs and preferences. To implement a construction programme based on locally acceptable solutions.

83. Options to be demonstrated should fall into two categories:

1) Systems which use off-field (external) catchment area including:

- water spreading (spate irrigation) with traditional planting techniques.
- run-off harvesting with traditional planting techniques.

2) Systems which use on-field catchment including:

- arrangement of plant spatial distribution.
- spatial distribution associated with construction.
- fallow systems.

Crops traditionally used by farmers in the area would be used. All demonstrations should be divided for the presence or absence of FYM. Economic trees for fruit, shade and browse would be built into the designs.

84. The technical base for the programme is weak at the moment in terms of locally evaluated techniques and local staff capacity. For this reason initial actions should involve;

- Establishment of a moisture conservation section in SWCS.
- Appointment of key senior local staff, who already have some experience of water harvesting.
- Appointment of an experienced water harvesting consultant to assist with programme development.
- Study tour orientation particularly in Yemen, Somalia, Sudan and possibly Israel.
- Selection of initial areas for the programme.
- The development of area specific design options.
- Appointment of District level support probably district soil and water conservation officer (water harvesting), agronomist, survey staff.
- Development of district level support facilities, drawing office and equipment mainly.
- Provision of transport and allowances.
- Support staff training including construction of initial demonstration.

85. Subsequent actions would involve a programme of demonstration probably at sub-location level in probably two selected Districts initially one with bimodal rainfall and one with unimodal distribution, probably building-up to six Districts over a three year initial phase.

86. Uptake should commence slowly in year 2 of operations in each sub-location which has benefitted from demonstrations. Uptake would depend on farmer response to the demonstrations and to the financing and assistance packages which are developed, financed from funds provided at the District level, subject to beneficiary participation. The District level financing would cover design sub-contracted to the District staff cadre and implemented by beneficiaries with outside assistance as necessary, supervised by the TA or JTA.

87. The question of whether or not mechanical assistance should be provided by the Heavy Machinery Services of MOA or its successor or equivalent especially in less densely populated areas should be carefully considered, when the programme is designed. A major factor to be taken into account will be labour availability.

88. To develop this option further a number of issues will need to be resolved:

- Institutional: the need to establish a Land Development Division staff cadre at headquarters, province and district level to deal with policy, direction (management), design and implementation; the need to commit existing MOA field staff to carry out demonstration supervision and extension.

- Financial: the need for a clear policy decision on the extent of beneficiary contribution, the extent of government assistance including food for work. The policy would remain in force even when famine relief is being made available, implying that famine relief would be used to assist development of public lands.
- Organization: clear decisions will be required on whether works should be promoted on an individual or group basis; whether a watershed approach is necessary or appropriate.
- Technical: In order to keep design simple and priorities clear only two non-engineering interventions are proposed, fertility improvement involving animal manure; and tree establishment. Careful consideration is needed to determine whether the tentative design idea is over simplified, or could be simplified further.

#### Improved crop husbandry, crop storage and mixed farming

89. Once moisture conservation is firmly established within an area agronomic improvement should be worth promoting. The programme should include crop storage; encouragement of mixed farming, including ox cultivation, in Zone V.

90. The soil moisture improvement programme should allow the extension advice being disseminated in AEZ IV to be extended to AEZ V and VI. Maize would become a realistic crop choice for the first time in these areas. First generation crop husbandry message should include the promotion of early land preparation, target date planting, optimum plant density, and early weed control. Second generation messages would include crop choice, cultivar choice (early maturity), rotation development. Third generation messages would include use of insecticides on legumes and cereals.

91. A continuing theme of an extension programme should be improved crop storage to allow more flexibility from season to season and to allow farmers to select when they should market their surpluses.

92. Encouragement of mixed farming should include draught power and milk production from either cattle or goats plus improved fodder/browse production, introduction of leguminous tree species for nutrient recycling, fodder, shade and mulch.

93. The extension programme would be run as an expansion of NEP but considerable attention would need to be paid to finding subject matter specialists with knowledge of and enthusiasm for development and expansion of suitable crops for the ASAL area. JT and JTA's carrying out the field work would need to be retrained. Training assistance may well be sought from the staff of the Dryland Farming Research Station, Katumani and the University of Nairobi.

#### Seed production

94. The objective of development of seed production for the ASAL areas would be to augment cereal seed production already being carried out by the Kenya Seed Company, which is basically concerned with maize, but may also include sorghum and millet to a limited extent (unchecked). Various seeds are already produced by government stations (Katumani, Kiboko), and by the several ongoing ASAL programmes.

95. Seeds most likely to be required are cowpea, green gram, pigeon pea, sorghum, and millets (bullrush, finger, foxtail and common). Methodology would include contracting by individual farmers initially organized by MOA. Constructors should receive a packaged programme including seed, pesticide and husbandry advice. Fields would be inspected to ensure acceptability. Acceptable produce would be bought in probably by MOA initially, stored dressed and packed for redistribution/sale at the beginning of the subsequent planting season.

96. Whilst initially MOA would control the seed production its aim should be to hand over to a suitably qualified agent as quickly as possible retaining regulatory functions (i.e. field inspection, germination and purity testing).

97. Seed production may well be most effectively organized using Zone IV farmers rather than those in the ASAL areas. The important thing is that alternative better quality seed of adapted improved varieties should be available to ASAL farmers.

98. To improve seed production for the ASAL areas it will be necessary to appoint an officer with specific responsibilities at District level, provide him/her with a working budget, transport, storage facilities. At field level TA and JTA's would be used for implementation. Regulatory functions could be carried out by the National Seed Quality Control Services (NSQCS) which may need strengthening for the purpose (unchecked).

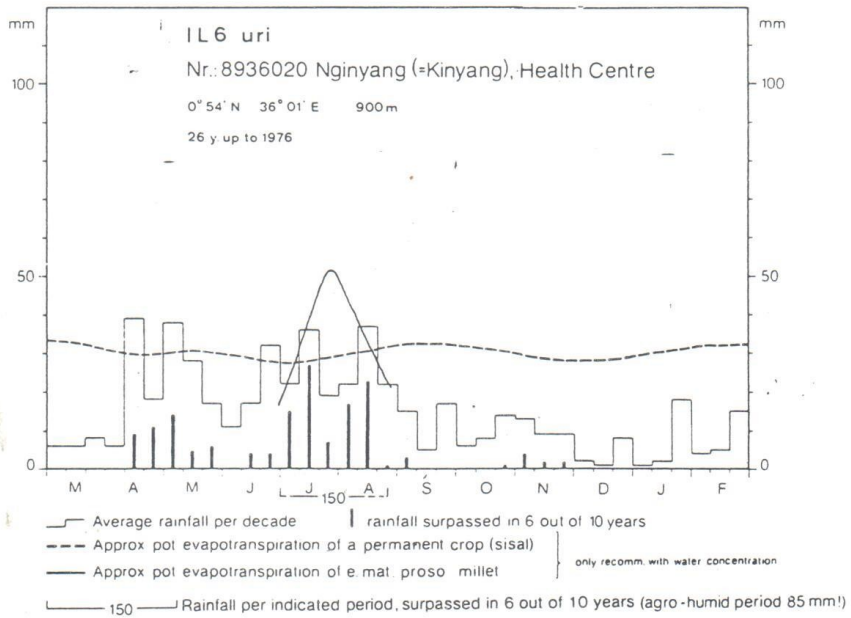
#### VI. FOLLOW-UP

99. A workshop on ASAL development will be sponsored by GOK/IFAD in June 1987. TORs are attached (Appendix 2) to allow preparation of two papers for the workshop.

- Implications for improving moisture availability for plant production in AEZ V - VII.
- Design options, labour requirements and costs of water harvesting in the ASAL areas.

**KENYA**

**ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT**



Source: Farm Management Handbook of Kenya



KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

AREA UNDER SORGHUM BY PROVINCE AND DISTRICT, 1970-77  
(ha)

Province/ District	1970	1971	1972	1973	1974	1975	1976	1977
<u>Eastern</u>								
Meru	600*	600	600	1,218	1,220	1,500*	1,200*	1,400*
Machakos	1,052	759	481	743	731	1,600	1,100	1,200*
Embu	2,146	2,300	1,565	798	922	3,471*	5,033*	1,566*
Kitui	13,584*	16,292*	19,000	21,000	22,100	10,500	17,500*	18,750*
Marsabit	-	-	-	-	-	-	-	-
<u>Nyanza</u>								
S. Nyanza	n/a	40,213	24,548	1,373	1,395	1,618	19,576	24,186
Siaya	10,715	33,369	18,317	18,574	14,055	16,781	10,823	23,771
<u>Rift Valley</u>								
Keiko Mara	108*	304*	250	500	60	70	1,545	200
W. Pokot	50	50	288	270	119	150	230	240
Baringo	50	20	-	-	15	280	122	83
Narok	-	-	-	-	-	-	-	-
Turkana	-	-	-	-	45	12	82	34
<u>Coast</u>								
Kilifi		32		26		44	222	100
Taita/ Taveta		41		228		60	103	86
Lamu	68	165		50		35	-	204
Kwale		-				2	1	23
Tana River		25				-	20	
<u>Western</u>								
Busia	9,728	10,621	10,839	7,179	6,579	10,001	7,915	6,594
<u>North Eastern</u>								
Mandera	-	-	1,500	-	-	250	-	1,500

\* estimated.

Source: Elaborated from Min. of Agriculture Annual Reports. (Chiodo-June, 1980).

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

AREA UNDER MILLET BY PROVINCE AND DISTRICT, 1970-77  
(ha)

Province/ District	1970	1971	1972	1973	1974	1975	1976	1977
<u>Eastern</u>								
Meru	3,087*	3,885	3,200	8,963	8,978	8,675*	7,130*	8,564*
Machakos	845	1,964	1,112	378	504	1,000	1,700	1,941
Embu	800	1,017	3,660	982	871	3,470	5,033	1,567
Kitui	25,000*	48,000	39,000	37,200	17,000	10,500	41,000	18,750
<u>Nyanza</u>								
S. Nyanza		6,850	3,197	5,266	2,533	3,777	6,523	7,903
Siaya		1,427	686	1,095	290	n/a	200*	269
<u>Rift Valley</u>								
Keiko Mara	2,100*	2,182	750	700	1,120	1,180	1,594	3,000
W. Pokot	740	945	2,665	2,110	1,280	1,740	1,423	1,780
Baringo	600	1,500	930	665	985	850	1,072	1,745
Narok	300	-	-	60	200	250	300	300
Nakuru	500	-	500	500	500	600	88	-
<u>Coast</u>								
Lamu	-	-	35	50	-	33	60	65
<u>Western</u>								
Busia	13,943	46,460	19,104	14,298	14,374	20,753	8,280	17,086

\* estimated.

Source: Min. of Agriculture Annual Reports. (Chiodo- June 1980).

Crop areas in hectares for selected ASAL crops

	Cassava		Sorghum		Millet		Cowpeas		Grams		Pigeon Peas	
	1980	1985	1980	1985	1980	1985	1980	1985	1980	1985	1980	1985
Kilifi	28,416	6,512 1/	12	73 1/			3,821	5,778 1/	930	1,231		
Kwale	1,386	15,000	23	245	-	140	569	1,912	42	743	58	371
Lamu	256	183	18	24	-		103	423	200	98	51	17
Taita/Taveta	254	610	43	?			61	418	48	188	62	290
Tana River	20	30	4	52 1/			-	-	388	1,100		
Garissa			3	3			10	17 1/	3	6		
Mandera			69	1,390			4	470 1/	1	63		
Wajir			17	708			2	74 1/	-	-		
Embu	500	4,200	8,694	10,702 2/			19,981	5,580	4,149	3,905	3,889	2,823
Isiolo			-	5			80	6	-	-		
Kitui	4,800	1,820	30,000	29,030			8,000	17,890	2,550	17,130	35,000	16,000
Machakos	1,697	1,550	2,100	20,000			36,500	38,000	860	6,000	25,000	4,200
Marsabit			15	29			4	54	14	9	3,056	5,442
Meru	825	1,040	8,130	21,368			2,250	8,533	2,300	6,900		
Siaya	7,624	3,448	23,830	26,518	515	100	?	?				
S. Nyanza	17,150	13,749	30,200	31,261	7,130	1,968	11,903	?				
Busia	6,510	1,700	21,548	8,093 1/	11,620	13,120 1/	?	?				
Baringo	10	66	1,457	70	1,908	1,046	20	30				
Kajiado			-	-								
Kericho/Marakwet			550	312	2,500	1,469	-					
Laikipia			30	1,446								
Nakuru			-	-								
Narok			-	-	200	246 1/						
Samuru			10	20	150	150						
Turkana			182	1,000 1/								
W. Pokot			550	198	550	93						
<b>Total</b>	<b>69,448</b>	<b>49,908</b>	<b>127,485</b>	<b>152,547</b>	<b>24,573</b>	<b>18,332</b>	<b>83,308</b>	<b>79,185</b>	<b>11,485</b>	<b>37,373</b>	<b>67,116</b>	<b>29,143</b>

Source: MOA District Annual Reports

1/ 1984

2/ includes sorghum and millet

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Varietal Recommendations for Baringo District

Crop	Irrigation (IRG)	Lowland Rainfed (LRF)	Medium Altitude Rainfed (MARF)	Tugen Foothills (TFH)
Maize	Local Hybrid 625 614 or 632	Katamani or Coast Comp.	Katamani Coast Comp or Hybrid 511	Katumati or Coast Comp.
Sorghum	(Not usually planted)	Serena or 956001 (white)	Serena 956001 (white) or Cold Tolerant.	Serena, or 956001 (white)
Finger Millet	Local or Gulu E.	Ekalakala	Local, Ekalakala or Gulu E.	Local Ekalakala or Gulu E
Bulrush Millet	(Not recommended)	Serena or Comp. B.	(Not recommended)	Serena, or comp., B.
Beans	Rosecoco Can. Won, etc.	Not recommended	Rosecoco Can. Wonder	Rosecoco Can. Wonder Etc.
Cowpeas	K.80	K.80	K.80	K.80
Ground-nuts	Senegal or (55-437)	Senegal or (55-437)	Senegal or (55-437)	Senegal or (55-437)
Tepary	(Not usually planted)	White	White	White
Green Grams	Local, 6828 or EA15364	Local 6828 or EA15364	Local 6828 or EA15364	Local 6828 or EA15364
Pigeon peas	Not recommended	Not recommended	423-LP	423-LP

SOURCE: BPSAAP.

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

CROP YIELDS (kg/ha)

	Contour Ridges	External Catchment	Fanya Juu	Control	Contour Ridges	External Catchment	Fanya Juu	Control	Contour Ridges	External Catchment	Fanya Juu
Oct/Nov Rains 1984				ZOMBE				KYUSO			
Maize i/c*	1780	1875	1845	1610	1145	1205	n/a	925	795	775	820
Tepary	85	135	135	120	75	190	n/a	320	175	235	135
Sorghum i/c	710	860	1850	1225	1630	740	n/a	840	155	430	755
Cowpeas	370	390	310	400	500	220	n/a	440	115	425	160
Mar/Apr Rains 1985				ZOMBE				KYUSO			
B. Millet i/c	285	280	245	455	735	690	n/a	505	155	655	545
Tepary**	(60)	(30)	(140)	(50)	55	170	n/a	65	115	195	85
Sorghum i/c	590	525	385	425	235	235	n/a	255	0	0	25
Cowpeas**	(35)	(45)	(10)	(45)	565	405	n/a	225	205	205	320
Oct/Nov Rains 1985				ZOMBE				KYUSO			
Sorghum i/c	775	405	305	n/a	155	n/a	100	n/a	335	455	125
Cowpeas	160	560	580	n/a	205	n/a	255	n/a	245	270	125
Maize i/c	725	510	550	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Beans				n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

\* i/c = intercropped with

\*\* At UKAI, the pulses in the intercropped were reversed, sorghum being with tepary and millet with cowpeas.

KENYA  
ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Kitui District

Danger of Famine Due to Crop Failures in the Livestock Millet Zone.  
With a very short cropping season and intermediate rains or vice versa =  
LM 5 vs + i or i + vs  
Sample: Ngomeni, Kitui District  
Crop combination: Sorghum, bulrush millet, cowpeas, green grams.

Year	First Rains		Second Rains		Famine Year	
	partial	total	partial	total crop failure	bad	very bad
1947						
48						
49	+		+		+	
1950		+	+			+
51						
52						
53						
54	+			+		+
55		+				+
56	+					
57						
58						
59		+	+			+
1960		+		+		+
61	+		+ a/		+	
62						
63						
64	+		+		+	
65		+		+		+
66						
67						
68				+	+	
69				+		+
1970	+					+
71		+	+		+	+
72			+		+	
73	+			+		+
74	+			+		+
75		+				+
76		+				
77						
78						
79						
% of years	24	27	21	21	18	33%
		51%		42%		51%

a/ Crop failure due to too much rain.

Source: Detailed interview with the Asst. Chief Francis K. Ndo, 26.8.79.

ANNEX 9  
Table 16

KENYA  
ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Average Labour Inputs (Man hours) per Household per Month and Year 1/

EMBU

	J	F	M	A	M	J	J	A	S	O	N	D	Total	% crop Total
<b>Kamarandi</b> (1 ha double cropped)														
<u>Crop Operations</u>														
Land Preparation	-	75	-	-	-	-	1	24	22	6	-	-	128	8.7
Planting	-	-	51	-	-	-	-	-	14	47	-	-	112	7.6
Weeding	-	-	1	127	10	2	-	-	-	6	131	21	298	20.3
Bird-scaring	170	6	-	-	168	158	28	-	-	-	-	204	734	50.1
Harvesting	44	25	-	-	2	38	51	1	1	-	-	-	162	11.1
Transporting	6	7	-	-	-	5	12	1	-	-	-	-	31	2.2
<b>Crop Total</b>	<b>220</b>	<b>113</b>	<b>52</b>	<b>127</b>	<b>180</b>	<b>203</b>	<b>92</b>	<b>26</b>	<b>37</b>	<b>59</b>	<b>131</b>	<b>225</b>	<b>1,465</b>	<b>100.0</b>
<u>Livestock Operations</u>														
Livestock Operations	206	206	206	206	206	206	206	206	206	206	206	206	2,472	
<b>Farm Total</b>	<b>426</b>	<b>319</b>	<b>258</b>	<b>333</b>	<b>386</b>	<b>409</b>	<b>298</b>	<b>232</b>	<b>243</b>	<b>265</b>	<b>337</b>	<b>431</b>	<b>3,937</b>	
<b>Kathera</b> (1.5 ha double cropped)														
<u>Crop Operations</u>														
Land preparation	-	43	23	-	-	-	10	46	84	2	-	-	208	10.3
Planting	-	1	64	4	-	-	-	-	10	93	2	-	174	8.6
Weeding	-	-	12	151	24	3	-	-	-	10	160	53	413	20.5
Bird-scaring	188	43	-	-	140	309	111	-	-	-	21	169	981	48.6
Harvesting	2	75	2	-	-	13	72	21	-	-	-	-	185	9.2
Transporting	1	19	2	-	-	2	21	13	-	-	-	-	58	2.8
<b>Crop Total</b>	<b>191</b>	<b>181</b>	<b>103</b>	<b>155</b>	<b>164</b>	<b>327</b>	<b>214</b>	<b>80</b>	<b>94</b>	<b>105</b>	<b>183</b>	<b>222</b>	<b>2,019</b>	<b>100.0</b>
<u>Livestock Operations</u>														
Livestock Operations	201	201	201	201	201	201	201	201	201	201	201	201	2,412	
<b>Farm Total</b>	<b>392</b>	<b>382</b>	<b>304</b>	<b>356</b>	<b>365</b>	<b>528</b>	<b>415</b>	<b>281</b>	<b>295</b>	<b>306</b>	<b>384</b>	<b>423</b>	<b>4,431</b>	

1/ Available family labour 2-3 adult equivalents.

Source: Rukandema et al. National Dryland Farming Research Station Katumani.

ANNEX 9  
Table 16a

Average Labour Inputs (Man hours) per Household per Month and Year 1/

KITUI

	J	F	M	A	M	J	J	A	S	O	N	D	Total	% crop Total
<u>Kwelu</u> (2.5 ha double cropped)														
<u>Crop Operations</u>														
Land Preparation*	-	-	57	27	-	-	-	4	25	75	59	-	248	11.3
Planting	-	-	34	9	-	-	-	-	2	16	26	-	87	4.0
Weeding	79	15	31	244	152	7	-	-	-	15	210	189	942	42.9
Guarding	68	83	29	27	60	126	6	-	-	-	7	4	410	18.7
Harvesting	1	96	98	6	5	81	149	35	1	-	-	-	472	21.5
Transporting	-	10	5	-	-	6	11	3	-	-	-	-	35	1.6
<b>Crop Total</b>	<b>148</b>	<b>205</b>	<b>254</b>	<b>313</b>	<b>217</b>	<b>220</b>	<b>166</b>	<b>42</b>	<b>28</b>	<b>106</b>	<b>302</b>	<b>193</b>	<b>2,194</b>	<b>100.0</b>
<u>Livestock Operations</u>														
Livestock Operations	319	319	319	319	319	319	319	319	319	319	319	319	3,828	
<b>Farm Total</b>	<b>467</b>	<b>524</b>	<b>573</b>	<b>632</b>	<b>536</b>	<b>539</b>	<b>485</b>	<b>361</b>	<b>347</b>	<b>425</b>	<b>621</b>	<b>512</b>	<b>6,022</b>	
<u>Kibiuni</u> (2.5 ha double cropped)														
<u>Crop Operations</u>														
Land preparation	-	3	110	19	-	-	-	-	27	34	69	1	263	7.7
Planting	-	4	72	-	-	-	-	-	9	23	40	-	148	4.3
Weeding	85	-	29	418	133	13	-	-	-	9	121	292	1,100	32.1
Guarding	247	163	27	12	248	167	17	-	-	-	-	34	915	26.7
Harvesting	5	254	89	-	38	204	184	92	2	-	-	-	868	25.3
Transporting	-	46	13	-	9	36	09	11	-	-	-	-	135	3.9
<b>Crop Total</b>	<b>337</b>	<b>470</b>	<b>340</b>	<b>449</b>	<b>428</b>	<b>420</b>	<b>221</b>	<b>103</b>	<b>38</b>	<b>66</b>	<b>230</b>	<b>327</b>	<b>3,429</b>	<b>100.0</b>
<u>Livestock Operations</u>														
Livestock Operations	134	134	134	134	134	134	134	134	134	134	134	134	1,608	
<b>Farm Total</b>	<b>471</b>	<b>604</b>	<b>474</b>	<b>583</b>	<b>562</b>	<b>554</b>	<b>355</b>	<b>237</b>	<b>172</b>	<b>200</b>	<b>364</b>	<b>461</b>	<b>5,037</b>	

1/ Available family labour 4-5 adult equivalents.

\* In many instances, especially for farmers using ex-ploughs, ploughing and planting are done as a single operation.

Source: IBID.



KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Agricultural Mechanization Stations ranked by Performance 1985

AMS Station by Perfor- mance Rank	Total Indus- trial tractors	Service- able tractors	Possible Produc- tive hrs.	Achieved Productive hours	Average Monthly Output/ Tractor	% Output/ Tractor
Ruiru	9	5	7,200	4,343	72.38	60.3
Kitui	4	4	5,760	1,530	31.88	26.6
Narok	5	4	5,760	1,191	24.81	20.7
Kipkelion	8	3	4,320	830	23.06	19.2
Garissa	4	3	4,320	601	16.69	13.9
Eldoret	8	5	7,200	930	15.50	12.9
Kajiado	3	2	2,880	363	15.13	12.6
Kitale	11	4	5,760	654	13.63	11.4
Machanga	5	4	5,760	617	12.85	10.7
Makueni	5	4	5,760	498	10.38	8.7
Naromoru	5	2	2,880	250	10.43	8.7
Nyahururu	10	3	4,320	305	8.47	7.1
Mariakani	10	5	7,200	458	7.63	6.4
Migori	6	3	4,320	269	7.47	6.2
Garsen	3	3	4,320	255	7.08	5.9
Nakuru	9	5	7,200	400	6.67	5.6
Margat	2	2	2,880	155	6.46	5.4
Bumala	5	4	5,760	260	5.42	4.5
Ciakariga	5	2	2,800	200	8.33	6.9
<b>Total</b>	<b>117</b>	<b>57</b>	<b>96,480</b>	<b>14,109</b>	<b>20.62</b>	<b>17.18</b>

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

Varietal Recommendations for Major Zones - Sorghum and Millet

1. Semi-Arid Highlands

Improved sorghum: No firm recommendations at present.

Promising Varieties Tested : White grain - BJ28XBG19, BG19X1291D, E35-1, 74B41 x 2KX 190/1, 76BT59, 76BTP15, P74 as 5388 Man64.

Brown Grain - E1291D, E1291DX BJ128, Martin B, BJ28, LH3270/51, BJ310, TX378.

Breeding Objectives: Earliness, good cold tolerance, resistance to bacterial stripe and streak, complete freedom from ergot and grain mould, resistance to bird damage and stem borer, good grain quality for human food with good dehulling properties for brown types even if used for livestock feed.

2. Dry Lowlands

Suggest Cereal Crop Mix: Millets 50-75%, Sorghum 25-50%, Maize 25% plus bare fallow 25%.

Improved Sorghum: No firm recommendations at present.

Promising Varieties Tested : Brown Grain - V-74-1-1-1, V-70-1-1-1, E525HR, SDX 135/13/1/3/1, 110-1, Turkana Local, 935092 Somali, SB65, SC566-14, White Grain - 2KX 76/7sh, 956001, (954066), IS 8595, (954062), W.A. Early pop, Serena 1-2W, Kitui 1, Yatta 3, Muvemba Local, plus some newer 1980 collections from E. Province.

RECOMMENDATIONS FOR MILLET VARIETIES

1. Finger Millet: Firm recommendations not available at present

Promising Varieties Tested: For R.Z.1. Serere 1, P224, P221, Gulu E, U.17.  
For R.Z.2: P224, WC 30, P283  
For R.Z.3: Ekalakala Local, Nzau Local & Mbitini Local, Kiaii Local  
For R.Z.4 & 5: Ekalakala Local

Breeding Objectives: These defined by the Finger Millet Consultant, (Mallanna, 1981) for different ecologies. Maturity, lodging, type of plant, incidence of blast, drought resistance and yield are important characters. Breeding of blast resistance, yield and earliness are given high priority.

2. Bulrush Millet:

Recommended Variety: Serere Composite II (improved)  
Better Introductions Tested. IVS-J454, SSC-H76, WC-B77, ICMS-7803, ICMS-7819, IVS-5454, IVS-P77, WC-C75, MBH 125.

Breeding Objectives: Improve Serere Composite II, which has excellent seedling vigour, by reducing height, incorporating rust resistance and good flinty grain type. Select for very stiff and long bristles as a deterrent to birds.

3. Foxtail Millet:

Recommended Variety : ISe 285  
Other Useful Varieties: ISe-248-1, ISe-294, Sav-Se-901, Kep-Se-17.

Katamani Base

From the range of test locations operated from the Katamani base over six

R.Z.2: Humid Coastal Lowlands, <100m altitude

Rainfall essentially monomodal from April-July, >500mm per crop cycle. Similar in many respects to R.Z.1A, except that Striga is absent. Sorghum and finger millet compete well with maize. e.g. Mtwapa.

R.Z.3: Semi-Arid Highlands. 1500-2000m altitude

Rainfall essentially monomodal April-August, 250-600mm per crop cycle. For these areas cold-tolerant sorghums are essential. Finger millet is suitable. e.g. Lanet, Kitale, Katamani (long rains sowing)

R.Z.4: Semi-Arid Mid-Highlands. 1300m-1500m altitude

Rainfall bimodal, >300mm per season. Ecological zones IV and drier III. Main planting season for sorghum is the short rains with ratooning on the long rains in average to good seasons. If planting on the long rains, cold-tolerant sorghum varieties are needed (see R.Z.3 above). Finger millet and Foxtail millets are suitable. e.g. Katumani, Murinduko.

R.Z.5: Semi-Arid Mid-Lowlands. 1000m-1300m altitude

Rainfall bimodal, 250-300mm/season. Ecological zone IV. Main planting on short rains with ratooning on long rains in favourable seasons. Bulrush, Proso and foxtail millets suitable. e.g. Kampi-ya-Mawe, Yatta, Tebere, S.I thookwe.

R.Z.6: Semi-Arid Lowlands. <1000m altitude

Rainfall bimodal, 250-300mm/season. Ecological zone IV to V. Planting and crops, as for R.Z.5, but season is shorter. e.g. Lower Embu/Meru-Tharaka, Mitungu; N.Kitui-Mwingi; Baringo; Coastal hinterland - Magarini, Matuga.

R.Z.7: Dry Lowlands

Rainfall essentially one season, 200-300mm. Ecological zone V to VI. Main sowing on best rainy season. Fallows important. Important zone for millets (except finger millet). e.g. Kiboko, Baringo, Turkana, W.Pokot, Mutomo (E&S Kitui).

Breeding Objectives: Wider screening of germplasm to identify earlier varieties with stiff stems, good yield and wide adoption. Large grain size and good quality for food desirable. Bristled types offer some protection from birds.

4. Proso Millet:

Recommended Variety: Serere 1

Other Promising Variety: N-40101

Breeding Objectives: Current varieties are good, very early and highly productive. Improve synchrony of heading and resistance to shedding perhaps.

AGRICULTURE

Terms of Reference

1 Object: To prepare a discussion paper to be entitled "Implications of improving moisture availability for plant production in AEZ V - VII".

Qualifications: Postgraduate degree in agronomy with at least 10 years' hands-on experience or research experience with the production of cereals and legumes in areas with less than 400 mm of precipitation per crop season. Particular knowledge encompassing sorghums, millets, cowpeas and grams would be desirable. Knowledge of crop response to moisture and the influence of soils is necessary.

Terms of reference: Following a brief review of the literature relevant to the subject, the agronomist would be expected to review in detail existing experience with moisture improvement and supplementary irrigation in Kenya. The review would include details of the methodology, yields and farmer response to the extent these are documented. Results will be related to the extent possible to existing climatic conditions and soils. The necessity or otherwise and the practicability of organic or inorganic fertilization will be estimated. On the basis of the above, and the excellent soils and agrometeorological data base which is available a possible programme of moisture conservation would be set out. The programme would prioritize the areas which could respond best, and note any complementary agronomic actions which may be necessary.

2        Object: To prepare a discussion paper to be entitled "Design options, labour requirements and costs of water harvesting in the ASAL areas". (The paper would draw upon climatic, soils and crop water requirement data generated by the agronomist).

Qualifications: Degree in agriculture or rural engineering with at least 7 years' hands-on experience with designing and evaluation water harvesting structures in various circumstances. Knowledge of both spate and run-off systems is necessary.

Terms of reference: Following a brief review of literature on the subject, the engineer would review in detail the structures which have been used in Kenya quantifying costs of construction and maintenance requirements. He/she would examine the extent to which alternative, and/or cost-effective, designs and methods of construction could have been used. On the basis of the above, suitable design will be recommended for various local soil and climatic conditions which would permit existing crops to be grown with increased security. Capital costs, recurrent costs and the increased security which is afforded will be quantified.

KENYA

ARID AND SEMI-ARID LANDS DEVELOPMENT

OFF-FARM INCOME-GENERATING ACTIVITIES

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TABLE

1. Sources of Smallholder Income, By Province

MATRICES

1. Non-Farm Income-Generating Activities
2. Institutional Support for Income-Generating Activities

APPENDIX

Terms of Reference



KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ACRONYMS

CRS	= Catholic Relief Services
CADRW	= Community Action for Disadvantaged Rural Women
DDO	= District Development Officer
DPO	= District Planning Officer
DSDO	= District Social Development Officer
ICDC	= Industrial and Commercial Development Corporation
IRP	= Integrated Rural Survey
KIE	= Kenya Industrial Estates
KREP	= Kenya Rural Enterprise Programme
KCB	= Kenyan Commercial Bank
KFFHC	= Kenyan Freedom from Hungar Campaign
NCCK	= National Council of Churches of Kenya
PFP	= Partnership for Productivity
PI	= Plan International
PVO	= Private Voluntary Organization
RDF	= Rural Development Fund
YP	= Youth Polytechnic

KENYA

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

OFF-FARM INCOME-GENERATING ACTIVITIES

I. INTRODUCTION

1. At the time when the ASAL programme was formulated, the rural informal sector's importance for the Kenyan economy was only partially appreciated. This annex asks some basic questions: (1) Should the future ASAL programme address non-farm activities? (2) If so, which activities should be addressed? (3) Which institution could handle the programme? (4) Is there scope for IFAD to invest in this area?

II. THE CASE FOR INCOME-GENERATING ACTIVITIES

A. The Place of Non-Farm Earnings in the Rural Economy

2. A growing body of research suggests that, in Kenya as a whole, off-farm earnings are the motor of rural development. In their study of Poverty and Growth in Kenya, Collier and Lal concluded that reinvestment of urban earnings in rural areas is the principal source of dynamism in the agricultural sector (World Bank, 1980). However, it is primarily the wealthy who are involved in the process of buying up land for conversion to commercial production, and the net effect has been to worsen rural income distribution by creating landlessness. This in turn has increased dependency on off-farm earnings among poor households (Kitching). Informal sector activities have a central place in the rural economy (Livingstone). While these studies focussed primarily on the high potential zones, there is evidence that in marginal and arid areas, the role of non-farm earnings is even more important.

3. Table below shows the percentage composition of household income, by income group and agro-ecological zone, in 1974/75 (Integrated Rural Survey, Round I). The "lower cotton" zone refers primarily to semi-arid (ecozone IV) areas in Machakos, Kitui, Embu and Meru; the "upper cotton" zone to semi-arid parts of Baringo and Elgeyo/Marakwet and "coast composite" to the better-watered coastal strip rather than the arid hinterland. The drier ASAL districts were not covered.

Distribution of Sources of Smallholder Income, by Income Group  
and Agro-Ecological Zone (in %)

	<u>Lower</u>	<u>Income group</u> <u>Middle</u>	<u>1/</u> <u>Upper</u>
<u>COFFEE</u>			
<u>East of Rift</u>			
Farm	40%	55%	55%
Wage	19	19	22
Other	4	26	23
<u>West of Rift</u>			
Farm	46	75	86
Wage	8	11	6
Other	45	14	8
<u>TEA</u>			
<u>East of Rift</u>			
Farm	29	85	45
Wage	8	4	10
Other	63	11	45
<u>West of Rift</u>			
Farm	76	68	50
Wage	7	14	34
Other	17	18	16
<u>COTTON</u>			
<u>Lower cotton East of Rift</u>			
Farm	9	39	15
Wage	23	9	21
Other	68	52	64
<u>Upper cotton West of Rift</u>			
Farm	47	61	39
Wage	4	11	38
Other	49	28	23
<u>Coast composite</u>			
Farm	15	31	49
Wage	7	12	27
Other	78	57	24

- 1/ Lower: KShs.0-499/- per adult-equivalent per annum  
 Middle: KShs.500-1499/- per adult-equivalent per annum  
 Upper: KShs.1500/- + per adult-equivalent per annum  
 Farm: Income from own holding  
 Wage: Regular wage employment  
 Other: All other off-farm income, including remittances

The use of adult equivalents corrects for variations in household composition and size.

Source: Livingstone, 1981, 14:12, 14:26. Based on IRS-I. 1974-75.

4. The percentage contribution of remittances to household income by agro-ecological zone is shown below. It is highest (29%) in the low rainfall zone of Coast Province, substantial in the rest of the coast and the "lower cotton" zone, and moderate in the "upper cotton" zone.

Zone	Percentage
<u>Coffee:</u>	
East of Rift	9.6
West of Rift	7.8
<u>Tea:</u>	
East of Rift	5.0
West of Rift	3.2
<u>Cotton:</u>	
Lower cotton (east of Rift)	15.5
Upper cotton (west of Rift)	9.8
<u>Coast:</u>	
Rain less than 40"	28.7
Rain more than 40"	18.7
Kenya (all zones)	8.9

Source: IRS-I (1974-75)

5. The analysis of income sources in IRS-1 was followed, in IRS-2, by a study of non-farm activities. The questionnaire investigated all activities other than crop and livestock production which had been carried out in the household for more than one month of the previous year. Table 1 (appendix) shows the nature of non-farm activities by province. The figures show the proportion of sample households within each province engaged in a particular activity. Since many households recorded either no activity or more than one, the percentages do not sum to 100.

6. According to these findings, 25% of the rural households in Eastern Province are engaged in "service" activities, 20% in manufacture of plant/animal fibre products or clothing, 18% in food and tobacco processing, 17% in wood processing (e.g. charcoal making), 15% in resource extraction (e.g. quarrying), 10% in construction, 8% in repairing, 8% in wholesale and retail trading and only 1% in pottery making. The pattern in Coast Province is roughly similar (although there is less wood processing and resource extraction). In the Rift Valley, households' overall involvement in non-farm activities is less widespread, and food processing dominates.

7. Many households engage in not one, but two or more non-farm activities, while others engage in none, as shown by the table below.

Prevalence of Non-Farm Activities in Smallholder Households

% Households

<u>Frequency of activities per household</u>	<u>Central</u>	<u>Coast</u>	<u>Eastern</u>	<u>Nyanza</u>	<u>Rift Valley</u>	<u>Western</u>	<u>Kenya</u>
0	63.8%	31.4%	49.9%	37.4%	58.8%	44.3%	49.6%
1	24.7	48.4	26.3	23.5	20.3	32.8	26.4
2	9.0	12.1	11.2	20.0	11.2	11.8	13.0
3	1.4	5.6	3.6	7.4	5.9	4.0	4.7
4 and over	1.1	2.5	9.0	9.7	3.8	7.1	6.3

8. In Coast Province, 69% of all rural households engage in one or more non-farm activities; in Eastern Province (which is more representative of ASAL areas), 50%; in Rift Valley (which also contains some ASAL areas), 41%. Although the totals are not disaggregated by income levels, given the lower income group's higher dependency on non-farm income (IRS-1), we can infer that the majority of low-income households are engaged in non-farm activities.

B. Rationale for a Non-Farm Income-Generating Component

9. The case for addressing non-farm activities within the ASAL programme is as follows:

- Agriculture's ability to support the growing ASAL population is declining, due to subdivision of holdings, conversion of low-potential ranch land into cropped land, displacement of pastoralists from former dry season grazing areas, soil erosion, overgrazing, invasion of undesirable bush species and deforestation.
- The majority of households have land and livestock holdings which are too small to cover all their food needs, let alone to provide a surplus large enough to cover their growing cash needs, even in an average year.
- At present levels of technology, the labour-absorptive capacity of smallholder agriculture is limited; introduction of labour-intensive farming makes little sense in areas where the risk of crop failure is high.
- Underemployment is a serious problem for youth in ASAL areas.
- The prospects for absorbing the excess population in formal sector jobs are limited by the high cost of job creation.

- The ASAL population's lower level of education in comparison with the rest of the country makes it more difficult for them to compete for urban jobs.
- The high vulnerability to crop failure and periodic droughts leads to correspondingly high levels of market dependency; this means that people in ASAL areas have greater cash needs.
- Lack of alternative cash-earning opportunities has led to widespread male migration from ASAL areas; absence of men at ploughing and planting time creates serious bottlenecks in the farming system, which are associated with late planting and low yields.
- In mixed farming areas, the high risk of crop failure and higher returns from livestock and off-farm work severely limit the incentive to invest in crop production beyond what is needed to cover the family's own consumption; likewise, in pastoral areas, armed raiding has reduced the incentive to invest in animals beyond the level needed for consumption.

10. The role of non-farm earnings in enabling households to cope with the effects of drought emerges as a key factor which cuts across farming systems. In mixed farming systems (Machakos, Kitui, Meru, Embu, Taita/Taveta) non-farm earnings play a stabilizing role as a hedge against crop failure. They enable households to get through a series of bad years without selling off their land and livestock. When households are unable to avoid selling off most of their land and livestock, they become wholly dependent on non-farm earnings for survival.

11. In pastoral systems, the critical factor at household level is market dependency during the dry season. When the livestock units per capita are too few to give enough milk for subsistence, households are forced to consume grain to make up the shortfall. What distinguishes pastoral systems with limited agriculture from pure pastoralist systems is the role played by self-provisioning crop production in reducing market dependency. Households which grow most of their own grain are able to conserve their herds; those which cannot grow grain cannot avoid selling off stock to buy posho unless they have access to remittance or non-farm earnings.

12. The stated objective of the ASAL programme is to alleviate poverty, and improve social and economic well-being, by raising incomes and generating income-earning opportunities. In the ASAL areas, off-farm and non-farm earnings are at least as important for family survival as earnings from crops and livestock. In fact, analysis reveals that the three income sources are inseparably bound up in a single system. Therefore a strong case can be made for concentrating on all three parts of the system: not just crops and livestock, but also non-farm production.

III. EXISTING NON-FARM ACTIVITIES: CONSTRAINTS AND POTENTIAL

13. The starting point for identifying viable non-farm income-generating activities should be to examine existing activities undertaken by the target group - their constraints and potential. This section synthesizes what is known about non-farm activities in ASAL areas, what is not known, and which gaps need to be filled in order to determine whether the sector has investment potential.

A. Distribution of Licensed Enterprises

14. The USAID Pre-Investment Study of Marginal and Semi-Arid Lands, Volume 6: Human Resources and Social Characteristics, contains detailed information on full-time, licensed non-farm enterprises in four districts. In Machakos, Kitui and Baringo, the study covered the entire district; in Embu it covered only 4 locations in Mbere Division. For each district, tables show location-by-location, what types of enterprises were found there in 1978.

Licensed Non-Farm Enterprises (1978)

Enterprise	Mackakos	Kitui	Embu	Baringo
Rural centres with over 10 shops	183	104	19	74
Butchers	527	270	15	26
Tailors	289	153	46	112
Tea Shops	793	248	29	69
Bars	645	113	42	81
Carpenters	99	34	5	115
Bicycle mechanics	108	29	12	33
Shoemakers	175	34	4	15
Blacksmiths	40	9	1	4
Barbers	68	16	4	5
Brick manufacture/quarries	66	7	5	11
Agric. processing	7	2	1	4
Timber mills	5	3	0	8

15. The distribution of licensed non-farm enterprises is strongly affected by the location's total population and its proximity to roads. Tea shops, butchers and bars show the widest distribution: in most locations of Kitui and Machakos, there was one tea shop per 1500 inhabitants, one butcher per 2000 inhabitants and one bar per 2500 inhabitants. Within a given district, there are more non-farm enterprises per capita in agro-ecological zone IV than zone V. For crafts there is evidence of specialization: certain villages have many tailors, others have many carpenters and others have many brick makers or quarries, while neighboring villages in the same zone have none.

B. Unlicensed Activities

16. Licensed enterprises, however, are only a small part of the total picture. Extrapolating from the results of the IRS survey on non-farm activities, it appears that for every registered enterprise, there are 500-1000 other persons practicing the same activity on an informal, unregistered, part-time basis.

Comparison of results of IRS non-farm survey with  
numbers of registered non-farm enterprises

Activity	No. of HH'S involved		Licensed enterprises	
	Machakos	Kitui	Machakos	Kitui
Food/agricultural processing	180 000	83 570	7	2
Wood working	170 000	79 000	104	37
Repairs	80 000	37 000	148	38
Clothing manufacture	196 000	91 000	464	187

17. If the ASAL programme were to target assistance strictly to licensed enterprises, the vast majority of the population involved in non-farm activities would be bypassed. Furthermore, there is considerable evidence that households owning butcher shops, tea shops, bars, matatus, tailor shops and the like are outside the priority target group (see Annex 2). A strong case can be made for targetting assistance to persons involved in unlicensed enterprises. Likewise, a case can be made for including types of enterprises not covered above. Many of the activities reported to be most important for the survival of the poorest households (charcoal making, beer brewing, vending of processed foods at markets and water points, sisal rope making, animal hides) are not on the list.

C. Costs and Returns

18. One of the biggest gaps in existing information about non-farm activities, especially those carried out by the poor, is lack of data on costs and returns. To date, neither government agencies nor NGO's involved in promotion of non-farm activities have gathered or published detailed information regarding the economic viability of existing enterprises. During the mission's review of existing literature, only one study was found which had comparative data on economic returns to non-farm activities (and it is out of date).



Hourly returns from non-farm activities: Mbeere  
Division, lower Embu, 1976 (n = 30 households)

Activity	Person Involved	Return/Hour
Livestock trading	men only	0 up to 1/=
Beekeeping (traditional hives, in the bush)	men only	0 up to 2/=
Making/selling charcoal	men only	-/55
Cutting/selling sisal	men only	-/71
Working in quarry	men only	-/75
House-building	men only	-/80
Working sugar cane press at bar	men only	-/95
Working on SRDP water trench	men only	1/=
Tailoring	men and women	1/20
Farm labouring	men and women	-/40
Making and selling beer	men and women	-/48
Crop trading	women only	0 up to 1/=
Selling mandasi & gruel	women only	-/26 to -/76
Collecting/selling firewood	women only	-/25
Collecting/selling thatch grass	women only	-/21
Making/selling sisal cord	women only	-/18

Source: Diana Hunt, 1977.

19. On the basis of these case studies, Hunt concluded that returns to non-farm production are considerably lower than those for livestock production, but higher than those from crop production and casual farm labour, and therefore attractive. In general, women seemed willing to engage in activities with very low returns in comparison with men. Many of the better-earning sidelines are exclusively male activities.

D. Existing activities: constraints and potential

20. Matrix 1 (next page) examines 12 non-farm activities currently carried out in ASAL areas in terms of ten criteria. The activities examined are:

- hand tool manufacture
- ox plough/toolbar manufacture
- beehive manufacture
- brick/cement block making
- charcoal making
- millet/sorghum beer brewing
- grain milling
- home food processing
- sisal crafts (Kenya bags)
- sewing/school uniform making
- hides and skins
- ethnic crafts

21. The criteria applied in making a preliminary selection of activities which the ASAL programme could consider supporting were the following: beneficiary demand for assistance, need for outside support, suitability of activity for IFAD target group, importance of activity for survival of the poor, labour intensity, unit cost, local tradition and skills, local availability of raw materials, profitability, and market prospects.

22. Manufacture of hand tools. Because ASAL projects in Machakos, Kitui, Embu and Meru are distributing hand tools as part of their programme for soil and water conservation, a large incremental demand exists which could have strong multiplier effects on local blacksmiths' business.

23. Manufacture and repair of ox-drawn implements. At the time of the pre-investment survey, 40% of the farm households in Kitui and 99% in Baringo did not own a plough. Most ploughs owned were the "victory" model. The tool workshop at Katumani has developed a variety of tillage and weeding implements which can be attached to the widely-diffused Liberty plough. Modified versions of the victory plough have also been developed. Apart from the demand generated by ASAL projects for the manufacture of such implements for demonstration purposes, the demand for such objects is not clear, and would have to be investigated.

24. Improved beehives. Projects in Kitui and Machakos report that the demand for improved hives (Kenya topbar model) is considerable (especially from women's groups which have seen them demonstrated). However, the nearest supplier is in Thika. There are no suppliers in the project area.

25. Honey processing and distribution. In connection with promotion of beekeeping, there is scope for supporting efforts to set up honey collection centres in connection with processing facilities. In Kibwezi (Machakos), the processing and distribution of honey is handled by a women's group, which is assisted by an NGO. In Kitui, it is handled by a private honey processing factory, with assistance from the project livestock unit.

26. Brick/concrete block making. In a remote village at the far edge of the rangelands in the arid zone of Kitui, bricks were manufactured using local clay and dry wood cut from the bush. In the same village, people had also manufactured concrete blocks to line their wells, but they had not finished the work because of lack of capital to pay for the remaining cement and its transport to the village. One way of overcoming bottlenecks like these would be to set up a fund which would permit local entrepreneurs to buy cement on credit, transport it to the village, manufacture the cement blocks and sell them locally. The potential demand for such assistance needs to be assessed.

27. Charcoal. Charcoal making is controversial because it causes deforestation. As seen in Annex 2, many of the poorest households in ASAL areas depend on manufacture of charcoal to make ends meet, especially during the dry season, which coincides with the hungry season. A case study by Hagerud in lower Embu showed that the returns per manday to charcoal are twice those of growing cotton, which is the only cash crop which can be grown in the dry areas.

28. Beer brewing. In nearly all of the districts, it is reported that poor households depend on earnings from millet and sorghum beer, but drunkenness is a growing social problem. It is not clear whether assistance would be welcome or feasible.

29. Grain mills. Posho mills are a costly way of generating employment. In 1979, for each job created, the investment cost of a hammer maize mill was Ksh. 8333 and for a roller maize mill is was 41667. The Women's Bureau is promoting posho mills as an income-generating activity for women's groups. In this case, the supplementary income (and employment) is spread over a larger number of persons. Sorghum/millet decortication has also been proposed as a women's group activity, but it is doubtful that supplies are large enough or reliable enough to make it profitable. If the Women's Bureau can demonstrate that women's groups can run grain mills profitably, they should be supported.

30. Home food processing. Little is known about the types of foods processed for sale on a small scale in the various ASAL districts or the constraints faced by their producers. Prefeasibility studies would be needed before intervention would be possible.

31. Sisal crafts. In the central areas of Machakos and Kitui, 80-90% of the members of self-help groups manufacture 2-3 sisal "Kenya bags" per week, working only during their spare time between other tasks. Raw materials include sisal available from the plants on the boundaries of their own fields and natural or commercial dyes; designs are local. Quality varies enormously. The bags are sold unfinished (without leather handles) to a local intermediary (often a widow belonging to the same self-help group), who delivers them to a buyer in Kitui or Machakos. This buyer procures leather strips for the handles and may hire piece workers to put them together. Large batches are transported to Nairobi for sale to street stalls, stores and exporters. The number of intermediaries operating between the two districts and Nairobi is considerable and competition is stiff; margins are reported to be low at this stage in the marketing chain.

32. Village women report earnings of 20-30 shillings for a bag which sells for 60-70 in Nairobi. Women interviewed in two locations of Kitui reported that they earn more cash making baskets than their husbands do working off the farm. Although they could make more money by doing it full time, there is no way they can reduce the time taken up by most of their domestic activities and they would be reluctant to give up farming to make baskets because of the risk of remaining without food if the market for baskets collapsed. The Kenya Bag industry appears to be booming without much government intervention. For this reason, it is not clear whether outside support would be justified. The Women's Bureau has a crafts outlet in Machakos for its affiliated women's groups which has given special attention to upgrading design and improving quality control. The impact of this effort should be assessed.

33. Sewing/school uniforms. Children's clothing, and school uniforms in particular, are one of poor household's biggest cash expenditures. Although women's groups are interested in sewing, the activity is dependent on outside sources of raw materials and it is not clear whether local producers could compete with cheap Asian factory-made products sold at open markets.

34. Hides and Skins. Sale of hides and skins is an important source of income for pastoral households, and any activities which could increase the value-added accruing to them would be welcome. It is reported that attempts to launch leather crafts in Turkana and Marsabit were unsuccessful (due to lack of a market in particular). These experiences should be assessed to understand constraints.

35. Ethnic crafts. Assessment of the constraints and potential of this sector would require a separate study. The ASAL areas produce a wide variety of ethnic products ranging from Maasai beadwork to Akamba bows and arrows, which are offered to tourists for sale. However, because the prices received by direct producers are low, it may not be in the tribal peoples' interest to produce such articles for the tourist market unless they are able to bargain for a larger share of the final selling price. It would be useful to assess the experience of the Dutch beadworking project for Maasai women in Kajiado before taking further action.

#### IV. GOK POLICY REGARDING NON-FARM ACTIVITIES

36. Sessional paper No. 1 (1986) gives high priority to expanding informal sector non-farm employment in rural areas as part of its strategy for slowing migration to Nairobi and restoring a more healthy rural/urban balance. The main emphasis is on stimulating expansion of small-scale trade and industry in designated "gateway towns" and intermediate rural growth centres.

37. The paper identifies three principal means of stimulating growth in minor urban centres: (a) investment in infrastructure (water supply, electrification), (b) strengthening town administration (and enhancing the local tax base), and (c) promoting small scale informal sector employment, commerce and manufacture. The strategy for promoting non-farm employment has several prongs:

- macroeconomic measures (aimed at pricing capital at its real cost, to correct the existing bias against labour-intensive industry and facilitating importation of raw materials, semi-processed and intermediate goods);
- credit (to make credit available to small scale informal sector enterprises, subsidized loans would be provided to commercial banks for onlending at rates which would allow the banks a wide interest margin as an incentive to assume the overhead costs and risks; collateral requirements would also be adjusted to make it easier for small enterprises to qualify, savings would be mobilized in connection with credit);
- vocational training (improvement of curriculum and facilities at technical schools and village polytechnics);

- change in building codes (to call for more use of local building materials);
- change in government tendering procedures (to favor local suppliers);
- cooperative formation.

38. Seven institutions are singled out to carry out various aspects of the programme: the Ministry of Commerce and Industry (promotion of small scale enterprises), the Ministry of Local Government (town infrastructure and administration), the Ministry of Labour (promotion of labour-intensive production), the Ministry of Cooperative Development (cooperative formation), the Ministry of Education, Science and Technology (technical schools), the Ministry of Culture and Social Services (youth polytechnics) and Non-Governmental Organizations (in recognition of their existing role in self-employment and income-generating projects). The effort would be coordinated by a special unit for small scale enterprises which would be established in the Ministry of Planning.

39. Under the heading of credit, the paper states that low-cost loans will be made available through "cooperatives, NGO's and organizations of non-formal producers". Experimental schemes for extending credit to graduates of Youth Polytechnics and women's groups are identified as areas for future action.

40. Activities singled out for promotion include: manufacture of farm implements, hand tools, other farm inputs, pans and footwear, grain milling, food and agricultural processing, rain water collection systems, and containers for on-farm grain storage.

#### V. EXISTING INSTITUTIONAL SUPPORT FOR NON-FARM ACTIVITIES IN ASAL AREAS

41. Currently, support for non-farm rural activities is provided by three government programmes and a number of NGO's. This section analyses each programme in terms of (a) its objectives and strategies, the type of activities supported, their suitability for the target group, (b) the organizations's technical capacity for backstopping income-generating projects, its staffing and its coverage of the ASAL areas, and (c) numbers of beneficiaries and results achieved. Findings are used to draw conclusions regarding which institutions the programme should support.

A. Government Programmes

1. Kenya Industrial Estates

42. This programme, which was initiated in the mid-1960's, is a subsidiary of the Industrial and Commercial Development Corporation (ICDC). It provides four types of assistance: subsidized loans, skills training, extension services and subsidized, centralized infrastructure, to rural entrepreneurs. The only ASAL project which has channeled its support for non-farm activities through KIE is the EEC project in Machakos. During Phase I of that project, the donor provided funds to KIE for the construction of centralized clusters of workshop facilities in Machakos town and some of the division headquarters. It also intended to provide a line of credit to ensure that beneficiaries had sufficient capital to expand their enterprises after the move to new facilities. The credit has not yet been disbursed because it has taken several years to reach an agreement about how the fund is to be managed.

43. In the meantime, construction has gone ahead, and to date, six workshop clusters have been completed. Beneficiaries are licensed entrepreneurs, already associated with KIE, who lack facilities of their own. A wide range of enterprises is represented, including a tailor and a bakery. Generators provide all workshop units with electricity. The cost of electric power is heavily subsidized by the government (entrepreneurs pay 30% and the government pays the rest). As of September 1986, achievements under the Machakos project were the following:

Workshop clusters completed		6
Cost per cluster (10 workshop units)	Ksh.	10,000,000
Cost per workshop unit	Ksh.	1,000,000
Entrepreneurs installed (to date)		7
Persons employed per enterprise (avg.)		6
Investment cost per person employed	Ksh.	220,000

44. In the light of these figures, EEC staff has concluded that the rural industry programme in the Machakos project is too expensive to encourage. Many of the entrepreneurs could have built more appropriate and less expensive facilities if loans had been available for building their own premises. During Phase II, no new construction will be initiated. Instead, the project will provide ECU 260,000 to KIE to establish a revolving fund. The fund would make loans available for building workshop facilities, in addition to the purchase of equipment and raw materials, which are already covered to an extent by KIE's regular credit programme. The average size of loans disbursed under KIE's regular programme is 68,500 shillings. Under the Machakos project, the loan ceiling would be higher to cover construction costs. Funds would be lent to beneficiaries at 14% per annum interest.

## 2. Youth Polytechnics

45. The Youth Polytechnics are rural vocational training schools which are run by the Ministry of Culture and Social Services. Their purpose is to offer school leavers between ages 15 and 24 opportunities for training and work experience which improve their prospects for obtaining gainful employment or self-employment. As of 1983, there were 280 youth polytechnics assisted by government, scattered all over the country, providing skills training to 25 000 school leavers. Trades include carpentry, masonry, plumbing, motor mechanics, agriculture, home economics and other specialities depending on the demand, as well as the utility and marketability of skills within the local area.

46. In 1973, five years after the Youth Polytechnic Programme was launched, there were 67 YP's in Kenya, with a total enrollment of 3 836 students; at this time, 43% of the YP's and 36% of the students were in ASAL districts. There was at least one YP in every ASAL district, and 2 - 3 in Meru, Machakos, Kitui, Kwale, Kilifi and Taita-Taveta. Today there are 280, with 25 000 students, but a separate breakdown for ASAL districts is not available. The government policy for the establishment of new Youth Polytechnics is governed by the following criteria:

- the existence of local initiative and determination of the local people to help their youth;
- equitable distribution of projects throughout the country;
- opportunities in the local area for self-employment, group employment or wage employment.

47. Under the ASAL programme, 7 donor projects are providing assistance to Youth Polytechnics (Machakos, Kitui, Turkana, West Pokot, Elgeyo/Marakwet, Laikipia and Taita-Taveta). Projects in Machakos, Turkana, West Pokot, Elgeyo-Marakwet and Laikipia are financing the construction or expansion of the physical facilities (classrooms, and in some cases, dormitories and staff housing). Most projects are also providing facilities and equipment for workshops (carpentry, metal working, etc.). In addition, the Laikipia project provides scholarships for needy students.

48. As a vehicle for reaching youths in marginal small farm and pastoralist households, the Youth Polytechnics have a number of drawbacks. They are located in district headquarters, division headquarters and market towns; the majority of the students are from towns; only students who have completed primary school are eligible; and overall enrollment is limited. Although they provide skills training, they stop short of generating employment, because the graduates lack the capital and knowhow to set themselves up in business.

49. Only two projects attempt to generate employment directly, by involving students at Youth Polytechnics in manufacturing technologies to be demonstrated and diffused by the project. In Kitui, the idea was to train students to make Kenya topbar beehives and improved ox-drawn tillage equipment, which the project would distribute to local farmers for testing.

It was hoped that demonstration would generate local demand for the items, and that graduates would find a ready market for their skills.

50. Neither venture was successful. The students were taught to make beehives, but the products were un-usable because of imprecise workmanship and utilization of unseasoned wood. The project no longer recommends that beehives be made by Youth Polytechnics, but it would like to support training of experienced local carpenters in their construction. The problem with ox-drawn implements, on the other hand, was that the prototypes distributed to farmers for testing during the last months of the project and no demand was generated.

51. In Taita/Taveta, the idea is to involve youth polytechnics in the production and distribution of improved fuel-saving cookstoves and village water supply systems. In addition, instructors in masonry, carpentry, metal working and agriculture would be trained and supported by technicians from the Danish Volunteer service in various skills and services required by other project components.

52. At national level, the MCSS is about to launch a new programme in collaboration with ILO. The programme would provide credit to groups of Youth Polytechnic graduates to enable them to set themselves up in business. At the time of this writing, the programme's approval was delayed because of legal problems (it was not clear whether banks could make loans to youths under legal age and whether parents would agree to assume liability for their children's debts). CARE Kenya was also about to launch a similar programme with MCSS. The need for additional IFAD support is not apparent.

### 3. Income-Generating Activities for Women's Groups

53. The third government institution involved with promotion of non-farm activities in ASAL areas is the Women's Bureau of the Ministry of Culture and Social Services. The Bureau's major areas of interest include: (a) intensification and establishment of income-generating activities (e.g. handicrafts, pig/goat rearing, poultry, rabbit and beekeeping, vegetable and fruit growing) and small/large scale business development by women; (b) home improvement; (c) literacy drives among women and (d) development of social facilities.

54. Between 1982 and 1985, the Women's Bureau received outside donor assistance for developing income-generating projects under the FAO/SIDA project "Community Action for Disadvantaged Rural Women in ASAL Areas" (CADRW). Initially designed as an umbrella programme covering 17 ASAL districts, which would serve as a conduit for other donors, the SIDA project's actual achievements were much more limited. At the time of its termination, activities had touched four districts (Isiolo, West Pokot, Taita-Taveta and Kajiado) and 17 women's groups with a total of 691 members had been assisted. The project experienced numerous technical and institutional difficulties which are worth analyzing, to get a clearer idea of the constraints involved in promoting income-generating projects for women.



55. In addition to the SIDA project, donors are supporting income-generating components for women through ASAL projects in Turkana (NORAD), West Pokot, Elgeyo/Marakwet, Ndeiya/Karai, Kajiado (Netherlands), Taita-Taveta (DANIDA) and Wamba (GTZ). In Kitui (USAID) and Machakos (EEC), women's groups have been assisted for beekeeping without calling it a women's component (this is an integral part of the ASAL livestock programme); in Meru and Embu (ODA), this has occurred for goat keeping. In practice this means that 12 out of 13 ASAL projects promote income-generating activities for women's groups, and 9 of them do this through the Women's Bureau. Apart from the ASAL projects, the Rural Development Fund also funds income-generating projects for women in ASAL districts. The next section analyzes the experience of these projects and draws lessons for future programmes.

#### The Experience of the FAO/SIDA Project

56. Community Action for Disadvantaged Rural Women in ASAL areas was originally intended as a multi-sectoral project designed exclusively for women. Its objective was to address the women's multiple roles in food production, income-earning and domestic activities, through simultaneous action in several sectors (e.g. crop and livestock production, non-farm production, water and fuel supply). Rural women were to identify their own needs, and the project would develop a methodology for assisting them.

57. Ideally, a multi-sectoral project of this type would have involved ministries of agriculture, livestock, water development and natural resources (forestry), but this did not occur. Coordination at national level was provided by the Rural Development Unit in the Ministry of Planning, but the executing agency was the Women's Bureau in the Ministry of Culture and Social Services. Representatives of the other ministries sat on the coordinating committee in Nairobi, but their line staff was not involved in the project. This led, at district level, to an unsatisfactory situation: the person charged with implementing the project was the MCSS District Social Development Officer (DSDO), who had no mandate to call upon the staff of other ministries to assist the women's project. In practice, this meant that priority needs such as water could not be addressed; it also meant that activities such as goat raising, beekeeping and vegetable growing were launched outside of (and in competition with) the regular programme of the ministries of agriculture and livestock, and without the benefit of their technical backstopping.

58. Many of the logistical difficulties faced by the project in supervising and backstopping activities were a direct outgrowth of the institutional difficulties. In effect, all of the technical input for goat rearing, beekeeping, handicrafts and the like was provided by one associate expert based in Nairobi, who was forced to commute back and forth to women's groups in four widely-separated districts. Although the project provided limited training to MCSS social workers and community development assistants on technical aspects of goat rearing and the like, it was unable to utilize the services of subject matter specialists in MOA and MLD. The Phase II project proposes to create posts for a livestock expert and a crops expert in MCSS Nairobi to handle the technical input to women's groups.

59. Supervision of beneficiary group activities has been equally problematic. Since duties connected with the FAO/SIDA project are in addition to the DSDO's regular duties, the quality of supervision at district level depended greatly on the motivation of individual DSDO's to take on additional work. Another problem was lack of transport: the project only had one vehicle and MCSS staff at district level had no transport of their own to allow them to supervise women's groups. In practice, this meant that all of the supervision had to be provided by the project coordinator in the Ministry of Planning in Nairobi, who would drive to the districts, pick up MCSS staff in the project vehicle, and take them to the women's groups.

60. In total, the project spent only 3% of its \$ 550,000 budget on direct assistance to women's groups. Numbers of groups assisted in each district and membership are listed below. No information is available on the criteria used in choosing the groups, but criteria are suggested in the proposal for Phase II. They include: stability of group, motivation, cohesiveness, beneficiary contribution (capital, labour) to the project and lack of assistance from other sources. Apart with a concern for involving women from different ethnic backgrounds, there is no stipulation that beneficiaries should not be wealthy. No information is available on the age, marital and socio-economic status of existing beneficiaries.

Women's Group and Membership

	WOMEN'S GROUP			MEMBERSHIP		
	Total	CADRW Assistance	% Assistance	Total	CADRW Assistance	% Assistance
Isiolo	12	3	25	360	102	28
Kajiado	260	4	2	30 000	191	1
Taita Taveta	193	5	3	11 440	268	2
West Pokot	53	5	9	583	130	22
<u>TOTAL</u>	<u>518</u>	<u>17</u>	<u>3</u>	<u>42 383</u>	<u>691</u>	<u>2</u>

61. Table below shows the amount received by each group. The average sum received was \$ 940 per group (\$ 23 per member). All assistance has taken the form of grants. Although credit was foreseen in the original project design, no credit has been given, and institutional arrangements for its disbursement have never been worked out. Two of the groups, however, are reported to have established revolving funds. Information on their operation is not available.

Financial Input to Group's Activities as of June 1984

Name of Groups	Membership	Amount Received		% Received
		% Sh.	US. \$ <u>1/</u>	
<u>ISIOLO DISTRICT</u>	<u>102</u>	<u>32,000</u>	<u>1,940</u>	<u>12</u>
1. Emong	56	10,000	606	(31)
2. Kambi Odda	26	10,000	606	(31)
3. Kinna	20	12,000	728	(38)
<u>KAJIADO DISTRICT</u>	<u>191</u>	<u>80,000</u>	<u>4,848</u>	<u>30</u>
1. Olkinos	70	20,000	1,212	(25)
2. Nkiito	48	20,000	1,212	(25)
3. Embakasi	45	20,000	1,212	(25)
4. Elekunya	28	20,000	1,212	(25)
<u>TAITA TAVETA DISTRICT</u>	<u>268</u>	<u>80,000</u>	<u>4,848</u>	<u>30</u>
1. Nyuki	31	15,000	909	(19)
2. Itingi	44	10,000	609	(12)
3. Kivumbi	43	15,000	909	(19)
4. Paranga	40	20,000 <u>2/</u>	1,212	(25)
5. Mlundingi	110	20,000 <u>2/</u>	1,212	(25)
<u>WEST POKOT DISTRICT</u>	<u>130</u>	<u>72,000</u>	<u>4,364</u>	<u>28</u>
1. Siria	13	20,000	1,212	(28)
2. Kabtabuk	27	20,000	1,212	(28)
3. Losam	40	10,000	606	(14)
4. Chepnyal	26	10,000	606	(14)
5. Wakorr	24	12,000	728	(16)
<u>TOTAL</u>	<u>691</u>	<u>264,000</u>	<u>16,000</u>	<u>100</u>

1/ US\$ = % Sh. 16.5.

2/ Revolving Fund.

62. The tripartite evaluation report did not present any information on the income generating projects' operation, achievements, the profits generated to date, their economic viability or sustainability. This is a serious gap which would have to be filled if the ASAL programme were to try to build on or learn from the SIDA project's experience.

The Experience of Income-Generating Components in Other ASAL Projects

63. In comparison with the SIDA women's project, women's income-generating components in larger ASAL projects have several advantages; (a) MCSS can borrow technical expertise from other components; (b) MCSS officers can share transport with other ministries; (c) they are freed from a lot of the administrative work (because this is handled by the central PMU); and (d) the larger project can fund complementary actions which MCSS could not afford. Nonetheless, the Kitui project's experience suggests that a strong case could be made for locating beekeeping and goat raising activities under the technical ministries rather than MCSS.

Experience with Income-Generating Projects under RDF

64. Since 1983, the Nordic donors have preferred to channel their support for income-generating activities through the Rural Development Fund rather than the Women's Bureau. As the Rural Development Fund's priorities shift from social infrastructure to directly productive projects, an increasing share of RDF assistance has been disbursed in support of income-generating projects for women's groups (see Annex 4 on District Focus). According to the 1985 study of the fund's socio-economic impact, half of the income-generating projects evaluated appeared to be economically viable and half were clearly un-viable. The evaluation team visited 21 women's group projects in 8 districts, half of them ASAL districts, and half in high and medium-potential areas: 7 projects were found to be viable as designed, 2 group projects were continued on an individual basis, 7 collapsed, and 4 were still under construction. In the ASAL districts, out of 7 projects, not one was viable: 6 had collapsed and 1 was still under construction.

65. All money allocated under RDF is provided on a grant basis; the groups are supposed to raise 20-25% of the total project cost up front (materials and self-help labour); RDF provides the rest. In Narok, out of 2 women's groups assisted, one received 35,000 for poultry (housing), but the project collapsed after one year when all the chickens died. The other received 60,000 to install a windmill to provide water for a pig project; the project was completed, but useless because no pigs were bought. In Kilifi, out of 3 groups assisted, a goat breeding project had collapsed, a poultry project suffered water problems, and a zero grazing dairy project was still under construction. In Wajir all 3 women's projects had collapsed (poultry, group farming). In Machakos, no women's projects were assisted under RDF.

66. As explained in the Annex on District Focus, RDF projects are implemented by the various line ministry departments at district level. As a catalyst, the donors have provided 8 engineers at provincial level to assist with project implementation. This assures technical quality of infrastructure design, but for direct production projects, this alone is not enough to ensure economic viability of activities.

## B. NGO Programmes

67. The list of NGO's involved in promoting income-generating activities is probably very long, since hundreds of NGO's operate in Kenya. Only a few of the largest programmes were investigated at this stage: the Kenya Rural Enterprise Programme (which serves as an umbrella programme assisting PVO's involved in development of small-scale rural enterprises), Oxfam, CARE, Plan International (PI), Kenyan Freedom from Hunger Campaign (FFHC), and Catholic Relief Services (CRS). CRS was excluded because it does not have a programme for income-generating activities in Kenya.

### 1. Kenya Rural Enterprise Programme

68. The Kenya Rural Enterprise Programme (KREP) is an indigenous, Kenyan NGO which acts as an umbrella programme assisting PVO's involved in development of small-scale rural enterprises. Since 1983, it has received a grant of \$ 2.3 million under the USAID Rural Enterprise Project to strengthen its capacity to provide institutional support to PVO's operating in the sector. The USAID project provides an additional \$ 4,155 million in grants direct to the KREP-assisted PVO's, to enable them to provide credit and business assistance to their beneficiaries. The PVO component, in turn, is part of a larger \$ 48 million project which is intended to support private enterprise in areas outside Nairobi and Mombasa. Although its main thrust is private enterprise, project funds are channeled through the Central Bank, to private banks and the NGO programme. This establishes a precedent for channeling funds intended for use by NGO's through GOK which could be useful to IFAD.

69. To qualify for KREP assistance, an NGO must be private, non-profit, registered in Kenya, registered with USAID, administratively sound, involved with the rural poor, and have prior experience; its programmes must: (a) focus on production/income-generation, (b) directly assist the poor, (c) be cost-effective in reaching the poor, (d) emphasize off-farm production, (e) be located outside Nairobi and Mombasa, and (f) be financed at least 25% from non-AID sources. It must accept KREP technical assistance as a condition for getting funds, and agree that if default rates are high, the assistance will be suspended. The justification for making all NGO's accept KREP assistance was that, in USAID's view, existing PVO's operating in the sector: (a) were reaching their management limit and could not absorb more funds without strengthening and streamlining their operations and (b) their overhead costs per loan were higher than large scale lenders' and needed to be reduced to make them viable.

70. Assistance includes: (a) training (business accounting, marketing, skills training, finance, establishment of revolving funds), (b) technical assistance (project organization, management, administrative systems, evaluations), (c) preparation of feasibility studies. KREP has 5 persons on its staff, specialized in finance, credit, training, and women's project development. Participants in its training courses are PVO staff.

71. The PVO component of the USAID project has been ongoing since 1984. Since it is a three year project, this component would have ended in 1987. However to date, implementation of the main part of the project (i.e. the \$ 48 million scheme for lending to private enterprise) has been delayed by negotiations between USAID and GOK regarding how the funds are to be channeled and managed. Because of this circumstance, the PVO component is likely to be extended for another 2-3 years with additional funding drawn from unspent funds under the other component. During the second phase KREP will provide direct assistance to beneficiary groups on its own in addition to supporting PVO's.

72. To date, 19 PVO's have been assisted and 20 other PVO's are in various stages of applying for assistance. 90% of these organizations operate revolving loan components for their clients. Some of the NGO's supported include: (a) The National Council of Churches of Kenya (NCCCK), which has received a grant of 5 million shillings to set up a revolving fund disbursed through KCB; (b) Partnership for Productivity (PFP), which is utilizing its grant to move from agricultural projects into credit, collective purchase and transport of agricultural inputs; (c) KENGO, an NGO involved with production and diffusion of fuel-saving cookstoves in connection with afforestation; and (d) TOTOTO, an NGO involved in income-generating projects in Coast Province.

73. No study has been done on the beneficiaries of the KREP-assisted NGO projects, but 95% are self-employed and only 5% are employers. The average size of loans disbursed by PVO's is under 10,000 shillings, but some PVO's would like to move into larger projects (up to Ksh. 50,000 per enterprise). Since KREP-supported PVO projects started only in 1985, no statistics are yet available on job creation. The programme is definitely worth investigating as a possible channel for NGO participation in the ASAL programme.

## 2. CARE Kenya

74. CARE Kenya, an affiliate of CARE International, operates 5 types of programmes (primary education, youth polytechnics, rural water development, agroforestry and income-generating projects for women) in ten districts, including 5 ASAL districts (Machakos, Embu, Meru, Baringo and Taita-Taveta). Its income-generating project for women, which was launched in 1983, originally specialized in goat breeding. The response from women was good, but to date the goat projects have not achieved their goal of raising women's income. Problems encountered fall into two categories: (a) technical and (b) managerial.

75. On the technical side, targets were not achieved because it took longer than anticipated to complete the initial cross-breeding programme. Additional constraints were: shortage of grazing land (5 districts), seasonal labour constraints (at planting and harvest time), and the high cost of veterinary medicines. The conclusion drawn by CARE is that goat breeding needs so much time before women can earn a profit, that it should only be recommended in the districts where women already keep goats and grazing is available; elsewhere, the emphasis should be on activities which produce immediate, tangible profits. On the managerial side, the biggest problem was political interference. Literate group leaders (representing

certain women's organizations) took over the projects for their personal gain. The illiterate members' inability to check the financial record books made hard for them to defend themselves.

76. Starting in 1987, other activities such as beekeeping, horticulture, ox ploughing, posho mills, rental houses and fish trading will be included. Phase II (1987-89), with a total budget of \$ 1.9 million, aims at assisting 110 women's groups (25 members each = 2750 women) in ten districts, or 11 groups (275 women) per district. The total cost per beneficiary is Ksh. 7,855, including staff, transportation and administration. No feasibility studies have been done to determine whether these activities are economically viable. There are no arrangements for marketing. Technical backstopping is likely to be a problem, because CARE staff associated with the income-generating component is trained in livestock production, and has no expertise in the other fields. Management finds the idea of an ASAL fund open to NGO's attractive because it would help them to solve one of their own problems: of backstopping more projects and thereby justifying their overhead without having to fund the projects out of their own budget.

### 3. Plan International

77. Plan International operates a \$ 1,6 million programme in Eastern Province, which covers health, education, community development and resources/skills development. Approximately 5 000 families are benefitting. Income-generating activities include 3 goat projects, one pig project, 3 poultry projects, 10 rabbit projects, training in business skills and bookkeeping for 7 women's groups, and 3 small enterprise projects. Beneficiaries have to raise 25% of the value of the project through their own means; all assistance is on a grant basis.

### 4. Oxfam

78. Oxfam is active in goat projects in Turkana and Isiolo districts, which are supported by the World Food Programme. Its Isiolo goat scheme will also receive support from the ODA Embu/Meru/Isiolo project. Projects are of two types, "restocking" and "destocking". In the first, WFP food rations are monetized and used to buy goats, which are given to destitute households which have lost their stock. The beneficiary families are selected by the tribal elders. Oxfam has determined that the minimum number of goats which would be viable for a household's full subsistence is 60; so each beneficiary household is given 60 goats, a 6 months supply of maize meal and camping gear and sent off into the bush to go back to the nomadic life. To repay the project, they were expected to give two kids each year. In Isiolo, 100 households have benefitted to date. In Turkana, 329. Since the programme has only been going for a year, results are not known. Monitoring what use is made of camping gear, maize meal and goats is not easy when families are dispersed out on the rangelands. In Isiolo, beneficiaries reported that many goats died and no kids were born, so the project got no kids to build up their revolving herd.

79. The "destocking" scheme involved using WFP food rations to buy relatively large numbers of goats during the critical period at the end of the dry season and taking them to Mombasa for sale. The project acted in competition with local traders, bidding up the price of goats. Local traders brought pressure and the "destocking" project was suspended. In the light of what is known to date, Oxfam goat projects, while innovative, do not appear to offer a model which could be widely promoted.

#### Kenyan Freedom from Hunger Campaign (FFHC)

80. This NGO operates an umbrella programme which serves as a conduit for donor funds which are channeled to other local and international NGO's for project implementation. Dozens of local NGO's and hundreds of projects, including many income-generating projects, are funded through FFHC. Although it lacks many of the better features of KREP, the programme is worth investigating as a channel which could permit NGO's to participate in an ASAL programme.

### VI. ISSUES AND OPTIONS

81. There is a strong justification for addressing non-farm income-generating activities as part of the ASAL programme, because of the critical role these earnings play in households strategies for minimizing the economic consequences of drought. The priority target group for such activities should be lower income households with limited economic assets. The upper income group having full-time, licensed non-farm enterprises (shopkeepers, butchers, livestock traders, transporters, posho mill owners) is not a priority target group. Both males and females should be a target group, because the earnings of both are important for the survival of resource-poor households.

82. The long-range objective of the income-generating component would be to achieve a sustainable impact on the social and economic well-being of low income households, through support for non-crop income-generating activities. The immediate objective would be to develop a programme which:

- raises the incomes of a maximum number of poor households;
- promotes accumulation of productive assets and their use to generate further income;
- maximizes self-reliance and minimizes dependency on handouts; and
- ensures sustainability after programme completion.

83. In selecting which activities to support, existing activities undertaken by the target group should have first priority. Reducing bottlenecks in the supply of inputs for other programme components (e.g. handtools, beehives) is also a priority. The basic strategy should be to identify and alleviate bottlenecks in the existing production system. Increases in beneficiary incomes can be obtained: (a) by expanding



production, or (b) by enabling the direct producers to capture a larger share of the profit.

84. Activities having potential for support include: manufacture of farm implements (hand tools, ox plough toolbars), beehives, manufacture of building materials (bricks, etc.), and possibly charcoal making, honey refining, grain milling, other food processing, sisal crafts, sewing, hides and skins, or ethnic crafts. Further investigation is needed to determine the potential economic viability of these enterprises.

85. Programme design would build upon IFAD's previous experience with successful income-generating components, by incorporating the following features:

- organization of beneficiaries into small groups of individuals who know and trust one another;
- selection of income-generating projects by the direct beneficiaries;
- beneficiary commitment through equity or savings;
- utilization of group pressure to minimize misuse of funds;
- emphasis on quick yielding, high impact projects;
- gradual evolution of self-reliant, self-sustaining groups whose asset base qualifies them to participate in credit programmes.

86. At present, neither of the three government programmes has the capacity for handling income-generating projects of the type identified. KIE should be ruled out because of its programme's high cost per beneficiary and its emphasis on full-time artisans who are outside the priority target group. Youth Polytechnics are just starting their credit scheme for graduates, and probably cannot absorb more than the assistance already provided by ILO and CARE. Of the three GOK programmes, income-generating activities for women's groups have the most potential.

87. However, the existing programme of the Women's Bureau has an institutional weakness which has reduced the effectiveness of the FAO/SIDA project. MCSS is not in a position to call upon the technical ministries to backstop its projects, so it has resorted to providing its own crop and livestock experts outside of the system on a commuting basis. RDF projects for women's groups face the same difficulty. In addition, women's activities funded under RDF are biased in favour of costly (and often inappropriate) infrastructure for collective production units, which are later abandoned when group members split up into individual production units. Neither programme has the capacity for handling credit. Most of the income-generating projects emphasize farm rather than non-farm activities. Furthermore, they appear to be new to the beneficiaries. Substantial reorientation would be needed to make the women's programme viable. If Phase II of the former SIDA project (currently under consideration by UNDP) is funded, many ASAL districts would still be left unassisted, but MCSS backstopping capacity would be stretched to the limit.

88. The experience of the NGO Kenyan Rural Enterprise Programme is very interesting, because it seeks to develop local capacity to handle income-generating projects on an economic basis. The programme has several comparative advantages: it focusses primarily on non-farm (as opposed to farm) activities; while its main beneficiaries are women, men are also included (the biggest employment problem regards males, not females); it has a capacity for handling credit. The biggest disadvantage, as a potential channel for implementing a non-farm component in the ASAL areas is that it is already well-funded. CARE, Plan international and Oxfam have none of the same advantages.

89. The alternatives are the following:

- 1) an income-generating component focussed primarily on crop production, goats, and beekeeping/honey refining, backstopped primarily by line staff from the ministries of agriculture and livestock, with MCSS input for group mobilization and training of group leaders;
- 2) an income-generating component designed exclusively for women, coordinated at district level by the DPO or DDO, with MCSS handling beneficiary organization and the line staff from relevant technical ministries providing the technical backstopping;
- 3) an income-generating component focussed primarily on non-farm activities, but implemented entirely by KREP-assisted, or FFHC-assisted NGO's;
- 4) a combination of options 1-3.

90. The first strategy builds on successful experiences of ASAL projects in Machakos and Kitui, which are utilizing women's groups (registered by MCSS) as receiving mechanisms for line ministry programmes relating to goat raising, apiculture and the like. It has the advantages of: (a) avoiding duplication between programmes of MOA/LD and MCSS, (b) improving MOA/LD outreach (more people can be reached simultaneously by contacting groups instead of individuals), (c) better technical follow-up, (d) possibility of financing upstream and downstream inputs to groups through the regular line ministry budget, and (e) not aggravating the Women's Bureau's problem of backstopping too many projects. It has the disadvantage of not addressing non-agricultural activities and (probably) having to be implemented on a grant (as opposed to credit) basis.

91. The second strategy builds on the experience of previous Women's Bureau income-generating programmes for women, but introduces a major innovation: instead of relying on its own crop and livestock experts for technical input to women's groups, funds would be allocated to contract backstopping services from the relevant technical ministries on a project-by-project basis. In comparison with the proposed Phase II women's project, this has the advantage of (a) avoiding duplication of technical staff, (b) reducing the demands on MCSS, and (c) improving technical follow-up of groups. It has the disadvantage of excluding one of the key target groups for employment creation: male youth. The Women's Bureau and its staff would need training of the type provided by KREP to its affiliated NGO's (how to do a feasibility study, how to set up a revolving fund, etc.)

92. The third strategy builds on the experience of the Kenyan Rural Enterprise Programme. Under this set-up, the programme would finance the cost of income-generating projects undertaken by NGO-supported groups, but the NGO's would be expected to raise matching funds to cover their own staff and operating costs. For GOK, working through NGO's would have the advantage of extending local implementation capacity without increasing recurrent costs. For NGO's the arrangement would allow them to implement more projects without increasing their own costs. The disadvantage of working only through NGO's, is that government capacity to implement its own income-generating projects would not be strengthened.

93. The fourth strategy, of combining either option 1 or option 2 with option 3, appears to have the greatest potential.

KENYA

SOURCES OF SMALLHOLDER INCOME, BY PROVINCE  
% Distribution of Smallholder Income

Source of income	Central	Coast	Eastern	Nyanza	Rift Valley	Western	Kenya
Farm operating surplus	52%	27%	56%	74%	70%	51%	59%
Non-farm operating surplus	7	18	14	9	6	5	9
Regular employment	21	13	10	10	16	21	15
Casual employment	8	14	10	3	3	6	7
Remittances from relatives	9	24	8	3	3	15	8
Other gifts	3	4	2	1	2	2	2

Structure of Non-Farm Activities

Activity	Central %H	Central %P	Coast %H	Coast %P	Eastern %H	Eastern %P	Nyanza %H	Nyanza %P	Rift Valley %H	Rift Valley %P	Western %H	Western %P	Kenya %H	Kenya %P
Resource extraction	2.5	8.2	9.7	6.6	14.5	13.5	17.5	24.9	10.0	5.1	14.0	16.0	12.1	13.0
Food/Beverage/Tobacco	5.9	11.4	24.2	17.5	18.3	13.4	36.5	17.3	20.5	20.7	25.1	15.0	22.3	15.8
Plant Animal fibre, products/ Wearing apparel	4.2	9.8	21.0	13.9	19.6	15.1	12.2	8.2	13.2	10.1	6.8	5.6	12.4	10.9
Wood products	11.8	19.0	6.4	7.4	17.0	13.3	16.9	8.5	11.2	14.3	14.0	8.2	14.0	11.5
Pottery products	0.0	0.1	0.8	0.7	1.0	0.7	5.4	3.0	0.2	0.2	0.9	1.5	1.7	1.08
Metal products	1.7	1.5	0.8	0.5	1.0	0.8	1.6	0.9	0.7	0.7	1.2	0.2	1.2	1.0
Construction	0.8	4.4	2.4	4.0	9.5	7.5	6.8	4.8	0.9	2.6	4.6	5.8	4.7	5.2
Wholesale/Retail trading	7.3	13.6	6.4	3.9	8.0	9.6	13.7	12.2	5.9	16.1	12.1	11.9	9.3	10.9
Repairing	3.1	8.0	3.2	6.7	8.2	6.0	8.9	7.8	2.5	9.0	6.2	10.5	5.4	7.8
Services	14.3	23.9	25.0	38.9	26.2	20.1	14.7	12.4	10.9	21.0	21.4	23.2	17.8	22.8

% H = % of Household engaging in activity  
% P = % of Population engaging in activity

Source: Social Perspectives 2=2.  
Based on 1977 CBS Rural Non-farm activity Survey.

ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ANNEX 10  
Matrix 2

Institutional Support for Income-Generating Activities

Programme/ Institution	Need for donor support	Focus on IFAD target group	Adequacy of out- reach	Quality of tech. back- up/super- vision	Skills training capacity	Capacity to handle loans	Cost/ Benefi- ciary (Ksh)	Coverage of ASALS	Sustain- ability of pro- jects	Employ- ment impact
KIE (ICDC)	No: 5 donors already	no	poor (a few 100)	no info.	some	yes	high (220,000)	no info.	no info.	limited
Youth Polytechnics (MESS)	No: 11.0 project	60%	fair (8,000)	none to date	fair needs upgrad- ing	no (not yet)	high	all districts	no pro- jects yet	"
CADMI (Women's Bureau)	Possibly if UNDP does not fund	no info.	poor (691)	poor	poor	none	high (12,735)	4 districts	no info.	"
Women's Com- ponent other ASAL projects	No	"	no info.	no info.	no info.	"	low* (N=1,000)	9 districts	"	no info.
Women's Projects RDF	No	"	poor (550 females in 8 dists. in 10 years)	poor	none	"	(2,400)*	all ASAL districts	poor	"
KREP (NGO)	No: USAID	yes	19 NGOs served 20 in pipeline	business aspects only	business skills	yes	no info.	limited	no info.	"
KREP- Affiliated NGO's	No: USAID covers	"	no info.	no info.	no info.	"	"	no info.	"	"
CARE Women's IGP programme	No: Canada	"	(2,750) target	no info.	only for livestock	no	(7,855) med-high	Taita/Taveta, Embu, Meru, Baringo	Goats not sustain- able	Goats did not gen- erate income/ employment
Plan International						no				no info.

KENYA  
ARID AND SEMI-ARID LANDS (ASAL) DEVELOPMENT

ANNEX 10  
Matrix 1

Non-Farm Income-Generating Activities

Activity	Beneficiary demand for assistance	Need for support	Suitable for IFAD target group	Importance for survival of poor	Labour Intensity	Low Unit Cost	Local tradition + skills	Local availability of raw materials	Profitability	Market prospects	Other considerations
Hand tool manuf.	yes	yes	?	Tools yes	Relatively		yes	no	?	Local (good)	Inputs for ASAL proj.
Ox plough											
Toolbar manuf.	no info.	yes	?	no			no	no	?	Local (limited)	
Beehive manuf.	yes	yes	?	no	yes		no	?		Local (good)	
Brick making	no info.	?	yes	?			clay = no info. cement = no			?	
Charcoal		?	yes	yes		yes	yes	in arid brush-land		good near towns only	Neg. environmental impact
Beer brewing		?	yes	yes				sorghum/millet		?	Neg. social impact
Owner food processing		?		depends on method				yes		Local (good)	
Sisal crafts (Kenya bags)		Flourishing on own	yes	yes			Kitui, Machakos, part of coast	only in Kitui, Machakos Coast		good now but decline expected	
Sewing/school uniforms	yes	?	?	?						question-able	
Hides/skins	no info.	?	yes	yes			in pastoral areas	in pastoral areas		?	
Ethnic crafts	yes	?	yes	?			yes	not beads		(tourists) + export	

















