KITUI/MACHAKOS SIMSIM DEVELOPMENT PROJECT PROPOSAL

A SASOL PROPOSAL

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BACKGROUND

Simsim is a tropical crop whose adaptability to local conditions has led to the breeding of suitable varieties for temperate zones. It thrives at low altitudes 0 -1500m and requires high temperatures above 20^0 C.

The plant is drought resistant requiring moderate rainfall which is well distributed over the growing season. The plant is found in areas with 500 - 800 mm annual rainfall. The plant is a short day plant which flowers in 40 - 45 days and matures in 110 - 170 days.

It is believed that simsim originated in Eastern Africa, a view which is supported by a large collection of its wild species here. Marco Polo refers to the production of simsim oil in Abyssinia during his travels. The plant found its way to Asia, China and Japan. The first documented significant planting of the plant in Kenya was carried out at the Coast between Lamu and Mombasa in 1850. A French company exported 3600 tons of simsim in a decade from this first know planting.

Currently in Kenya simsim is grown in the Coast, Nyanza, Western and North-Eastern provinces. The areas of growth are in AEZ 3,4, and 5. In these areas, simsim has been grown in the last 50 years. The plant has been introduced in the Eastern Province recently in the cotton growing zones which are in the same AEZ as the already established areas.

The low risk of failure compared to other crops makes simsim a very attractive crop in ASALs. In AEZ 4 the probability of harvesting a maize crop is 2 out of 3 seasons. In AEZ 5 the probability is 1 out of 3. Under the same conditions, the probability of harvesting a simsim crop is 8 out of 10. Better than average conditions give higher yields. Maize is the reference crop in these areas as it is the staple food. One can grow it or buy it.

Coupled with the low risk is the question of inputs and yields. Maize has generally a higher input demand than simsim and a lower yield per unit area in these marginal lands.

COMPARATIVE OIL CROPS RETURNS

The following figures are based on medium management levels with minimised use of farm inputs for different oil crops.

	Sunflower	Simsim	Soya Beans	Groundnuts
Production				
Yield kg/ha	750	500	675	600
Producer price Ksh.	3.20	5.00	5.00	6.70
Gross income Ksh./ha.	2400	2500	3375	4020
Variable Costs				
Land preparation	500	500	500	750
Seed	180	37	1186	900
Planting	126	126	252	252
Weed control	270	413	270	492
Harvesting	500	225	256	318
Packing	150	75	68	90
Transport	375	200	270	240
Total costs	2101	1576	2796	3042
Gross margin Ksh./Ha.	299	924	579	978
Break even price Ksh./Kg.	2.80	3.15	4.14	5.07
Gross margin Ksh./kg.	0.40	1.85	0.86	1.63

Source:Unga Ltd.

Data collected by the Ministry of Agriculture trials on simsim in Lamu District are shown below:

	Ksh. per acre
Cost of land preparation	350
Weeding	330
Total variable costs	680
Yield kg/acre	376
Price per kg	5.00
Output per acre	1880
Gross margin	1200
Gross margin per kg	3.19

One should note that the total variable costs do not take into account planting, harvesting and packing. Hence the gross margin per kg is on the higher side.

COMPARISON OF SIMSIM WITH OTHER CROPS

a. Maize

Soil type	Chromic luvisol	Vertisol
Yield kg/acre	225	540
Price Ksh/kg	2.70	2.70
Gross income Ksh.	607	1458

The gross income has to be viewed against the probability of yield. In AEZ 4 there is a possibility of a yield of maize on 2 out of 3 seasons. In AEZ 5 there is satisfactory yield only 1 out of 3 seasons.

Simsim being more drought resistant than maize will give a crop every season.

b. Cotton

Soil type	Chromic luvisol	Vertisol
Yield kg/ha	500	800
20% A grade @ Ksh. 10 per kg	1600	1000
80% B grade @ Ksh. 5 per kg	3200	2000
Gross income	4800	3200

The gross income from cotton has to be viewed against the fact that this is an annual crop. In addition, cotton has a high variable cost due to the high demand for insecticide, harvesting labour, and weeding over two seasons.

SIMSIM AS DEVELOPMENT CATALYST IN ASALS.

The movement of the Kamba from the hills of Machakos to the flatlands of Eastern Machakos and Kitui started this century. The driving force of these migrations seems to be the consolidation of grazing lands and extension of livestock production. Inclusion of the areas west of the Machakos hills into White Highlands in from 1902 resulted in additional pressure on these lands. During the early decades of this century, the livestock industry was based on open grazing in communal lands. From the 1930's, as an aftermath of the great drought, which decimated large numbers of Kamba stock, there was a shift towards crop agriculture on individual holdings.

Permanent settlement in the ASALs is a result of land pressure. The early settlers in these areas maintained ties with their "hill" homes which produced the food. As the population increased, there has been demarcation of the land into smaller units. As there has been no wholesale development of

livestock production, the net result has been a falling standard of living for livestock producers in this region.

As the land pressure increased, in the 1950's and 1960's, there has been a new wave of migration into the ASALs. Since it is no longer possible for the new migrants to engage in the extensive livestock production, due to the size of holdings, they are mainly engaged in crop production. The ASALs are predominantly millet zones, but agricultural extension has traditionally promoted maize production. The result has been frequent crop failure. This scenario leads to a situation in which the migrants not only fail to produce food, but also fail to generate income for buying food. These people are therefore condemned to perpetual hunger.

The philosophy which is pertinent for development of ASAL production is assure that marginal returns per unit investments are higher than those achieved in higher potential lands. This can be achieved if the investments do not consume external inputs which require scarce foreign exchange. Generally the increase in production of the high potential areas is dependent on increasing fertilizer, fungicide, and insecticide application, which are not environment friendly. The development of ASALs however, can be achieved if right techniques, suitable plants, and conservation of water for production, measures which are all environment friendly, are implemented.

The development of ASAL would enlarge the market for food from the high potential areas. It would also shift the production of some crops from the high potential areas which would concentrate only on the crops of highest returns for that zone. Wholesale land conservation could produce this change. The driving force for this change would be the development of potential crops in the ASALs which will ascertain constant production, increasing buying power and development of the population.

Crops which have been found to do well in the ASALs include the pigeon pea, green gram, and simsim. Pigeon pea is widespread in areas of Eastern Machakos and Kitui, albeit higher yielding and perennial varieties need to be introduced into the area. Currently this area produces the bulk of the pigeon pea consumed in Kenya. This is one of the plants of the future. Green gram is another crop in the area which will have an effect on the consumption patterns in Kenya in the future.

Simsim however occupies a special position in the anticipated development of ASAL suitable crops. The crop produced in Kenya has been shown to contain a high content of oil. Of the two varieties of simsim grown in Kenya, the white variety has an oil content of 51% while the black variety has an oil content of 48%. The demand for oil in Kenya is largely met by external sources through the importation of palm-oil from the Philippines. This importation is limited by foreign exchange constraints. Thus there is an acute

shortage of oils in the country. To alleviate this situation a serious promotion of oil crops is necessary. The drawback to this development is the setting up of a system to promote the growing and marketing of the crop. The commercial sector though willing to buy the crop has no mechanism for the development of the crop.

The residual cake from oil processing from both varieties has a protein content in the range of 44% to 50%. ASALs are seen as the base for future production of milk in this country. The Wamunyu Friesian Society is a living testimony to this. In the short space of ten years, this organization has built up the capacity to supply Kitui town with milk. This is a beginning of a shift in milk production, from high potential areas where there is overcrowding, to ASAL areas, which are not traditional milk producers. Such shifts in production will inevitably transfer incomes from high potential milk production areas to the ASALs. A concurrent development is the creation of a need for animal feed in these areas for the intensive animal feeding required in the dairy industry. Simsim cake as an input in cattle feed would act as a support crop of the dairy production. Simsim introduction therefore contributes to an integrated development of the ASALs.

The natural evolution of simsim in the area of operation would initially involve selling to established oil millers outside the growing area. Eventually however, as sufficient production is built up, local processing of the crop on individual, locational or cooperative basis would be undertaken for increased earning in the locality.

PROJECT OBJECTIVES

1. Income Generation

Failure of crops grown by conventional agriculture is a prominent feature of the ASALs of Eastern Machakos and Kitui. People eke out a living through subsistence crops including maize, pigeon peas, green grams, beans and other cultivated crops.

The cash generating potential of the simsim is the production of oil which is in short supply in the country. Its drought resistance and high potential yields and few pests make it a very attractive crop. Yields of 1000 kg per hectare have been recorded at the coast in pure stands and up to 500 kg in association with other crops.

A 50% yield of the recorded yield at the coast is 500 kg per ha. The current price to the farmer is Ksh. 5.00 per kg. This works out to Ksh. 2,500.00 per ha. per season or Ksh. 5,000.00 per ha. per year. This might not seem to be much, but has to be compared to the alternatives which are much worse. It should also be borne in mind that this yield is achieved without fertilizer or

improvement of land at all. With land capitalization much higher yields would be reaped as evidenced in other areas where simsim grows.

2. Resource Improvement

As a corollary to income generation described above, it would be expected that there would be a drive for higher yields hence higher incomes. The Wamunyu Friesian experience bears out this phenomenon. When one attains one Friesian which can be fed comfortably, it has been seen again and again there has been a drive for pasture improvement to carry more cows. This drive leads to more milk hence more money for the farmers.

A similar system would be expected to operate with the simsim growers, fuelled by an observable economic improvement setting off a chain reaction.

The measures which would be taken by the farmers would include stopping of mining the land, soil building, water harvests for production and genetic preservation.

3. Farmers Education

80 per cent of the population of Kenya was born since independence in 1963. Primary education has been free and compulsory since then. As a result, a large percentage of the population can read. Simple manuals with large clear illustrations are one of the most effective methods of dissemination of information.

A novel method of learning that of travel, observation and adoption of the learned techniques is used in the region by some farmers who produce Friesians in the harsh ASAL environment. Although it is expensive to travel, the investment yields profound dividends. A similar technique is used by Bread for the World in their workshops for agricultural extension staff.

A related technique, which is very powerful, is the holding of farmers meetings on one of the farms on a rotational basis. This facilitates constructive criticism by the farmers, involvement of all members in the meeting and renders an ideal forum for exchange of ideas and techniques.

4. Community participation

The community in Eastern Machakos and Kitui is aware of crop failure, food insecurity and lack of cash generating schemes in their environment. They know also that their most important resource is their land. However, without a market outlet as an incentive to production, they continue to mine their

land to eke out a subsistence. The quantum leap will be made only when markets and marketing systems are assured. Such an assurance would lead to the capitalization of the land. This proposal has originated from the community to fulfil their identified need for increasing incomes so as to capitalize their land.

5. Linkage with District Focus

Government of Kenya participation in all communities is channelled through the DDC and sub DDCs under its premier strategy for Rural Development, the District Focus For Rural Development Strategy. These committees are made up of local people who are essentially the owners of the projects in their own community. Their involvement in the projects serves as preparation for eventual take over of the projects. Further this system allows one to tap GoK services, whenever applicable in extension, monitoring, technical know-how, and resource sharing. It also avoids duplication and compliments community activities. The preparation of the proposal, its submission to potential donors, and final proposal is done on behalf of the local community. It will have to be discussed by the local District Development Committees prior to implementation. It is expected that the coordination will be under the office of the District Development Officer.

PROGRAMME AREA/FARMERS

The initial programme area is a corridor 200km. long and 40km. wide running along the main Nairobi/Kitui trunk road. The area assures easy access for the distribution of seed and collection of produce.

The seed will initially be provided to selected farmers by location. One should though note that already, voluntary planting of simsim has already started in the programme area with 2 groups of 60 farmers each. The initial locations involved in the programme are:

1. Machakos District - Muvuti, Masii, Mwala, Mbiuni, Wamunyu

2. Kitui District - Yatta, Kyangwithya, Mulango, Kisasi, Mbitini, Kwavonza, Mutitu-Nuu- Endau.

The first stage of the project will involve 1000 farmers. Each farmer will receive 3 kg of seed to plant 0.5 ha. with simsim. A total of 400 ha. would thus be planted in the first year of the project.

The second stage of the project, to be undertaken year 3 will add an additional complement of locations as follows:

1. Machakos District - Muthetheni, Kiteta, Kivauni, Ikalaasa, Kisau, Masinga,

Kinyaata

2. Kitui District- Voo-, Mutomo, Athi, Ikutha, Kanziku-Mui- Zombe

TRAINING

The current GoK policy emphasises oil crop production to satisfy local demand for oil and substitute for importation of palm oil which has been the basis of the oil industry.

Simsim in the country is grown by small holders using simple hand tools. The traditional crop husbandry has to be improved to achieve higher returns from the plant. On - farm development in spacing, weeding, harvesting selection, and general crop husbandry is of immediate importance. It is therefore important to involve the farmer in all aspects of husbandry from the start of the programme. Eventually farmer participative research systems have to be implemented.

All training will be at farmers premises on rotational basis. The training will be handled by qualified agriculturalists and will seek a strong contribution from the farmer in the total processes of handling the crop.

The information gathered from the field will be compiled together with the technical input from the agriculturalists into a farmer newsletter. The newsletter will be produced quarterly. Feedback from the newsletter will be included in subsequent newsletters.

A simsim production manual will be prepared at the beginning of the programme with the technical details of the crop. The manual, 32 pages, A4 size will have clear, simple language, large photographs or drawings and form the base of farmer discussions facilitating effective feedback.

The participating farmers will be encouraged to form a loose association "Simsim Farmers Association". This association will be their training forum. They will choose where to hold the meetings and develop a rota. Lunches will be organized for these meetings by the programme at a cost of Ksh. 30.00 per person to be organised by the association.

Each group of farmers will have a maximum of 50 farmers. There will be inter-group visits either by delegates who come back and report to their own group or by whole groups. If the visits are on delegate basis, the delegation should rotate to achieve maximum participation in the group.

MARKETING

The marketing been the main bottleneck in simsim production in the country.

Between 1920's and 1960, Asian businessmen exported simsim from Nyanza. This trade stopped inexplicably in the sixties and production in Nyanza ceased for lack of market. Arab traders have always exported simsim produced at the coast to the Middle East. This trade continues to date. Both the Nyanza and Coast traders have always been characterised by very low returns for the farmer mainly since there was always a single buyer who dominated local buying and thus tried to maximise profit. Since the 1960,s some of the simsim was bought by cooperative unions or agents for the National Cereal and Produce Board which then sold to the traders for export. This inefficient marketing system stifled production by giving low returns to the farmers.

Due to the shortage of cooking oil in the country, the Unga Group, the biggest miller in the country, has established a processing company to extract oil. The group also deals in animal feed. The group buys directly from farmers or their organisations. Unga Group activities in the market place has improved the prices paid to the farmers. With the increasing need for feed for the dairy industry, the price paid to the farmer is bound to further increase as the returns from the by-products increase in value.

In this programme, the Machakos Cooperative Union will be the central buyer. This union has the management capacity to handle the crop. They are currently buying cotton from the growers, they also are the umbrella body for the coffee cooperatives and run an extensive horticultural produce export programme.

Kitui District Cooperative Union is weak and in this district it is envisaged that agents/buyers will be used initially as the Union is built up to take over the operation of the agents.

For the first three years, the simsim seed would be sold to the Unga Group for processing. From year three onwards local processing by MDCU, individuals or groups of individuals should be encouraged. These value added activities will create jobs in the local area. By this time there is expected to be power in large areas of the programme area. In addition the simsim growing area coincides with the dairy produce development area. The demand for feed will increase dramatically in this area in the near future as the number of animals increase. The MDCU already has a maize milling mill, it is in the process of acquiring a cotton ginnery. A simsim processing plant will complement the other plants in the production of animal feed.

It is therefore logical that the produce buying loan to facilitate timely payment of farmers for produce delivered, should be channelled through MDCU which has the capacity to handle it. GoK supervises cooperatives through the Ministry of Cooperatives.

PROJECT IMPLEMENTATION

The implementing agency for the programme is SASOL (Sahelian Solutions) which will undertake the preparation of the proposal and contract to the donors of the project for implementation.

1. Personnel

a. Project Director
b. Project Coordinator
c. Technical Field Officers - Agriculturalists
d. Secretary
e. Messenger
f. 1 driver 1st year (2 drivers added Year 3)

2. Equipment
Office furniture
2 Computers
1 Duplicating machine (making newsletter)
1 Typewriter (cutting stencils)

3. Transport

2 Motorcycles
2 4WD vehicles - Toyota Landcruiser Diesel
1 Lorry - Isuzu 7 ton (2 lorries - Isuzu 7 ton added Year 3)

COSTINGS

Year 1	Ksh.	US Dollars
1. Proposal preparation		
7 days @ 250		1,750
per diems 7 days @ 38		266
Subtotal		2,016
2. Pre-preparation - 6 weeks		
Contact farmers and appoint personnel		
by the programme director and coordinator		
42 days @ 275		11,550
42 days @ 250		10,500
Per diems		
42 days @ 38		1,596
42 days @ 38		1,596
Subtotal		25,242
3.a. Programme management		
Director 180 days @ 275		49,500
Coordinator 180 days @ 250		45,000
Per diems		
180 days @ 38		6,840
180 days @ 38		6,840
Subtotal		108,180
3.b. Programme staff		
Technical Field Officer @ 45,000 pm	540,000	
Technical Field Officer @ 45,000 pm	540,000	
Admin, Asst. Secretary @ 10,000 pm	120,000	
Messenger @ 4,000 pm	48,000	
Lorry Driver @ 6,000 pm	72,000	
Subtotal	1,320,000	44,000
4. Equipment		
Furniture	100,000	
2 computers @ 150,000	300,000	
2 Land Cruisers @ 600,000	1,200,000	
2 Motorcycles @ 50,000	100,000	
1 Isuzu lorry @ 1,000,000	1,000,000	

1 Typewriter @ 30,000	30,000	
1 Duplicating machine @ 100,000	100,000	
Subtotal	2,740,000	91,300

5. Office

a. Publication of 32 page A4 manual

Illustrations	50,000		
Editing	30,000		
Printing 1500 copies	60,000		
Subtotal	140,000	4,700	

b. Office Charges

Rent @ 1,000 pm	12,000		
Telephone @ 1,500 pm	18,000		
Power @ 1,000 pm	12,000		
Stationary/postage 2,000 pm	24,000		
Newsletter @ 4,000 pq	16,000		
Subtotal	82,000	2,740	

6. Vehicles Running costs

Motorcycles @ 10,000 pa	20,000		
Land cruisers @ 120,000 pa	240,000		
Lorry @ 200,000 pa	200,000		
Subtotal	460,000	15,330	

YEAR 1 SUBTOTAL 293,508

Year 2

1.Project Management

a. Management	108,180
b. Staff	44,000

2. Office running 2,000

3. General office expenses 2,740

4. Vehicle running cost 15,330

YEAR 2 SUBTOTAL 169,510

Year 3

1. Project Management

a. Management	129,816
b. Staff	52,800

2. Office running

a. Manual printing 3,000

b. General office expenditure	3,290	
3. Purchase of two lorries @ Ksh. 1,200,000 each	80,000	
4. Vehicle running cost	32,670	
YEAR 3 SUBTOTAL		298,286

Year 4	
1. Project Management	
a. Management	129,816
b. Staff	52,800
2. Office running	
a. Manual printing	6,000
b. General office expenditure	3,290
3. Vehicle running cost	32,670
YEAR 4 SUBTOTAL	224,576
Year 5	
1. Project running	
a. Management	155,779
b. Staff	63,360
2. Office running	
a. Manual printing	6,000
b. General office expenditure	3,950
3. Vehicle running cost	39,204
YEAR 5 SUBTOTAL	268,293
5 YEAR SUBTOTAL	1,254,173
20% CONTINGENCY	250,835
5 YEAR TOTAL	US$ 1,505,008

EXTENSION OF THE SASOL CONTRACT

The loan repayment by MDCU commences year 6 after the end of the project and culmination of the Sasol contract. Sasol should however continue supervision of the loan repayment and the revolving fund for a further 5 years. In this time a major portion of the loan would be repaid and MDCU would then continue the business on its own. The extension would be on a 3 month per year basis. The funds required for this project are:

		US$
90 days @ US$ 250		22,500
Per diems 90 days @ US$ 38	3,420	
Travelling expenses		4,000
Total per year		29,920
Total for 5 years	149,600	

PRODUCT BUYING

The farmer's simsim produce will be bought by the cooperative union for marketing. MDCU has an extensive experience in this line of work. It is already involved in the marketing of cotton, coffee, horticultural products and maize which is milled at their own mill with subsequent distribution of maize flour.

The proposal seeks a loan agreement with MDCU for the purchase of the produce from the farmers.

The proposal seeks to start with an initial compliment of 1000 farmers who will be provided with seed to plant 0.5 ha. Total planted land on first season will therefore be 400 ha.

Average yields reported in Kenya range between 500 and 1000kg per ha. without addition of fertiliser. Thus the minimum crop which needs to be financed by the first season is 200 tons. A yield of 400 tons is therefore expected in the first year. Consequent yields are deemed to double yearly for the areas covered in the first stage implementation. Second stage implementation will be started with double hectarage and is also expected to double in subsequent years.

PLANTING

	First stage		Second stage	
	(Acres)	(Ha)	(Acres)	(Ha)
Year 1	1,000	(400)	-	

Year 2	2,000	(800) -		
Year 3	4,000	(1,600)	2,000	(800)
Year 4	8,000	(3,200)	4,000	(1,600)
Year 5	16,000	(6,400)	8,000	(3,200)

FORECAST YIELDS

Year 1	400 tons
Year 2	800 tons
Year 3	2,400 tons
Year 4	4,800 tons
Year 5	9,600 tons

FINANCING REQUIRED FOR PRODUCE PURCHASE YEARLY

	Ksh.	US$
Year 1	2,800,000	
Year 2	5,600,000	
Year 3	16,800,000	
Year 4	33,600,000	
Year 5	67,200,000	
TOTAL TURNOVER	126,000,000	4,200,000

YEARLY LOAN REQUIREMENT

	Ksh.	
Year 1	2,800,000	
Year 2	2,800,000	
Year 3	11,200,000	
Year 4	16,800,000	
Year 5	33,600,000	
CUMULATIVE LOAN	67,200,000	2,240,000

The above figures are rather conservative, since already 1,000 farmers have prepared their land for simsim planting, based only on previous experience by 60 farmers with sunflower. The promise of better yields from simsim has generated this startling response.

LOAN REPAYMENT

Assumptions

1. 5 year grace period gratis of interest
2. 1.5% interest on reducing balances
3. Loan period 15 years

		Ksh. Principal	Interest	Total	Cumulative
6th Year	1.	280,000	42,000 =	332,000	332,000

7th Year	1.	280,000	37,800 =	317,800	
	2.	280,000	42,000 =	332,000	649,800
8th Year	1.	280,000	33,600 =	313,600	
	2.	280,000	37,800 =	317,800	
	3.	1,120,000	168,000 =	1,288,000	1,919,400
9th Year	1.	280,000	29,400 =	309,400	
	2.	280,000	33,600 =	313,600	
	3.	1,120,000	151,200 =	1,271,000	
	4.	1,680,000	252,000 =	1,932,000	3,826,000
10th Year	1.	280,000	25,200 =	305,200	
	2.	280,000	29,400 =	309,400	
	3.	1,120,000	134,400 =	1,254,400	
	4.	1,680,000	226,800 =	1,906,800	
	5.	3,360,000	504,000 =	3,864,000	7,639,800
11th Year	1.	280,000	21,000 =	301,000	
	2.	280,000	25,200 =	305,200	
	3.	1,120,000	117,600 =	1,237,600	
	4.	1,680,000	201,600 =	1,881,600	
	5.	3,360,000	453,600 =	3,813,600	7,539,000
12th Year	1.	280,000	16,800 =	296,800	
	2.	280,000	21,000 =	301,000	
	3.	1,120,000	100,800 =	1,220,800	
	4.	1,680,000	176,400 =	1,856,400	
	5.	3,360,000	403,200 =	3,763,200	7,438,200
13th Year	1.	280,000	12,600 =	292,600	
	2.	280,000	16,800 =	296,800	
	3.	1,120,000	84,000 =	1,204,000	
	4.	1,680,000	151,200 =	1,831,200	
	5.	3,360,000	352,800 =	3,712,800	7,337,400
14th Year	1.	280,000	8,400 =	288,400	
	2.	280,000	12,600 =	292,600	
	3.	1,120,000	67,200 =	1,187,200	
	4.	1,680,000	164,000 =	1,844,000	
	5.	3,360,000	302,400 =	3,662,400	7,274,600
15th Year	1.	280,000	4,200 =	284,200	
	2.	280,000	8,400 =	288,400	
	3.	1,120,000	50,400 =	1,170,400	
	4.	1,680,000	100,800 =	1,780,800	
	5.	3,360,000	252,000 =	3,612,000	7,135,800
16th Year	1.	-	-		
	2.	280,000	4,200 =	284,200	
	3.	1,120,000	33,600 =	1,153,600	
	4.	1,680,000	75,600 =	1,755,600	
	5.	3,360,000	201,600 =	3,561,600	6,755,000
17th Year	1.	-	-		
	2.	-	-		

	3.	1,120,000	16,800	=1,136,800	
	4.	1,680,000	50,400	=1,730,400	
	5.	3,360,000	151,200	=3,511,200	6,378,400
18th Year	1.	-	-		
	2.	-	-		
	3.	-	-		
	4.	1,680,000	25,200	=1,705,200	
	5.	3,360,000	100,800	=3,460,800	5,166,000
19th Year	1.	-	-		
	2.	-	-		
	3.	-	-		
	4.	-	-		
	5.	3,360,000	50,400	=3,410,400	3,410,400

SUMMARY

	Ksh.
Year 6	332,000
7	649,800
8	1,919,400
9	3,826,000
10	7,639,800
11	7,539,000
12	7,438,200
13	7,337,400
14	7,274,600
15	7,135,800
16	6,755,000
17	6,378,400
18	5,166,000
19	3,410,400
	72,801,800

US$ 24,267,267

LOAN REPAYMENT SOURCES

Assuming a Ksh. 1.00 nett margin for the MDCU per kg of produce, the following are the nett trade earnings per year.

Year	Produce handled (tons)	nett profit (Ksh.)
1	400	400,000
2	800	800,000
3	2,400	2,400,000

4	4,800	4,800,000
5	9,600	9,600,000

Even if the produce handled levels off at Year 5, the nett earnings for the year is higher than the maximum loan repayment. Taken together with the investment possibilities for nett earning in years 1 through 4, the MDCU should be able to turn a pretty comfortable profit enabling it to service the loan effectively.

SOCIO-ECONOMIC IMPACTS

Current incomes in the project area are largely dependent on repatriation of funds from migrant labour. Family members who have obtained employment outside the area are responsible for maintaining their families. When crops fail, virtually all their income is used for the purpose of buying food.

The alternative income which would be achieved through the growing of simsim would go a long way to meeting basic food needs and facilitate some saving locally. This income would promote food security/sufficiency through increase in purchasing power.

Improving individual small holder incomes would affect the families through increased on-farm employment opportunities in the short run. In the long run, opportunities for small scale oil presses would exist with the marketing of oil and the residual cake separately. The cake would be used in local animal feed formulations or sold to feed manufacturers. This local processing would create jobs for artisans to maintain the presses and also create a demand for a localised effective transport system.

The community as a unit would have greater spending power. It would therefore require and develop local supply centres which will keep the money in circulation locally rather than the current distance trading and migrant labour which in effect takes money away from the community. Local trading centres will act as a hub of commercial activity providing a further push in the local economy. More family members will find jobs locally and stem off the exodus of the most able and innovative members of the community.

The income thus obtained has a stabilising effect on the families. Further, it will go to meet the educational needs of the families, improve diets through the ability to afford different foods, thus improving health. Healthier bodies are capable of higher production. The savings achieved would be invested in improved building. Family and community income reinvested locally constitute development capital.

Improved incomes from land usually lead to investing in land improvement,

particularly land conservation. This is a voluntary process rather than coercion used by the authorities to enforce land conservation. As soon as a portion of the society engages in voluntary land improvement for obvious financial gain, then the balance of society joins in, in order not to be left behind. Land then moves from being mined for subsistence and becomes a precious commodity to be tended for more production. The net result is land capitalization. The community them moves from subsistence farming to more sustainable production. Water conservation, revegetation, and organic farming are some basic forms of land capitalization in arid lands.

Land conservation has effects on the environment. Once conservation measures begin, a snowball effect may be envisaged. For example, if one farmer starts bench terracing his land, it is possible in a poor rainfall year to obtain a yield of maize when all his neighbours harvest nothing. Next time around, a few farmers make efforts to terrace their lands. Their improved yield is an incentive to continue terracing. In a period of ten years, terracing can extended to a large section of the farmers. Each individual terrace contributes to the water holding capacity in the whole area. With time, the water table is bound to be affected positively which would lead to more stable yields in the general area. Other steps in conservation which are more communal rather than individual can then be considered. Eventually the whole environment is improved by simple introduction of a production incentive.

Diversification of production will come as a result of successful cash generating farm activities. The extra cash generated will go into improved diets. The demand for milk would lead to the development of the dairy industry. The farmers with larger lands are the ones most likely to move in this direction, although some of the small holders would specialise in dairy production under zero grazing options. This move is further facilitated by the ability to buy dairy animals from accumulated cash reserves or borrowing since individuals are credit worth. The keeping of animals in a community in which there was none is an indicator of economic progress.

With the expansion of animal production, there are increased possibilities of organic agriculture by using the animal manure in making compost. Organic farming has been used for a long time in the country but some families have no animals. Where cattle are not feasible it would be important to consider keeping small ruminants for manure to make compost.

On a national scale all the yield of oil grown locally directly substitutes for imported oils saving foreign exchange.

SASOL'S ROLES

Sasol as the project implementing agency has to:

1. Provide the technological input for simsim growing.
2. Organise production groups.
3. Supervise inputs.
4. Organise marketing.
5. Together with MCDU, supervise the crop buying revolving fund.
6. Conduct field trials on farmers land.

INPUTS TO FARMERS

The basic inputs the farmer needs are:

1. Technical know-how
2. Seed
3. Ploughing

Provision on technical know-how and marketing are the main constraints in growing the crop. Sasol, the project implementer, has the responsibility to provide these services. Technical know-how will be provided through the project management and the field technical staff. Currently, trials of simsim are continuing under Sasol involving two groups of 60 farmers each. An area of 50 hectares has thus been planted with simsim on trial basis. Field trials on simsim have been carried out successfully at Tharaka in Meru which has the same conditions as exist in AEZ 4 & 5 in Machakos and Kitui.

In addition to the provision of crop growing know-how, Sasol will organize the purchase of the produce from the farmer. Payment to the farmer will be on cash on delivery terms. Payment will be achieved from a revolving fund maintained by MDCU and supervised by both MDCU and Sasol. The lack of secure marketing system has been the major constraint in the production of this crop in the country.

As seed is not readily available locally, enough seeds will be supplied to the core farmers in the first implementation stage to plant 0.5 hectare, (3 kg of seed). The cost of the seed will be obtained from the revolving fund and would be recovered on delivery of the produce on harvest. The farmers will then be expected to keep their seed for replanting. Other farmers joining the project subsequently would obtain their seed from other local farmers. Thus subsequent supply of seed is not anticipated.

To start off the project, the only other major input which requires to be financed is ploughing. In this connection, to encourage organic farming, it is our opinion that ox ploughing rather than tractors would be employed. A scheme which provides a pair of oxen, harness and plough for a group of 50 farmers would be set up. Amongst the group, some farmers will own their own ploughing oxen and equipment. However for accountability, the advance

should be made to the group and the whole group should be accountable for the maintenance of the oxen and equipment which is theirs. The advance made from the revolving fund would be recovered on the first harvest. The shared facilities are important in helping the weaker members of the group and help in cementing the group together to achieve higher production goals.

Provision of further tools is not deemed necessary as the farmers are already involved in some activity and have some basic tools.

OPERATION OF THE REVOLVING FUND

The major purpose of the loan is to set up a revolving fund to facilitate timely payment to the farmers on delivery of produce to the MDCU.
Many production programmes have failed by the inability to pay farmers promptly. A delay in payment is a very strong disincentive to production. When the produce is delivered by MDCU to Unga Ltd., the normal 30 days payment terms for administrative purposes is expected. The possibility of Unga Ltd. advancing MDCU the cash for payment of the farmers does not exist hence the solicitation for these funds. After payment by Unga Ltd, the money is held in a MDCU account solely for this purpose until the next harvest.

ANNEX 1

KITUI DISTRICT

Kitui District has an area of 31,099 square kilometres, of which 6,309 is Tsavo East National Park. The district is a semi-arid region whose basic resources, land water, and forests, are either being depleted or are deteriorating in quality to the extent that they may be unable to adequately support a growing population.

The unreliable and unpredictable rainfall often leads to shortage of water, pasture, poor harvests and inevitable food shortages and famine in extreme cases. The only permanent rivers, the Athi and Tana rivers, form a common boundary between Kitui and the neighbouring Districts of Machakos and Meru and Embu respectively.

In spite of the semi-arid conditions of the District, about 37% of the Kitui land is of medium agricultural potential receiving between 500 - 800mm per annum. This amount of rainfall is sufficient to support rainfed agriculture provided the right type of seed and appropriate modern agricultural practises are acquired and adopted by the farmers. If the rainfall is evenly distributed Katumani maize and beans only require between 400 - 600 mm of rainfall per season while millet, sorghum and cow peas need between 175 - 380 mm per season. Most of the land receiving less than 500mm of rainfall is suitable for livestock rearing.

Kitui is divided into six administrative divisions, each administered by a District Officer. The six divisions are further sub-divided into 37 locations.

The demographic situation in Kitui District is one of the most alarming in Kenya. The total population jumped from 95,000 people in 1910 to about 640,304 in 1989. Thus, the population increased by almost seven times in only seventy nine years. The District population more then doubled between 1910 and 1948 and also between 1948 and 1979. The annual growth rate has progressively increased throughout the twentieth century. The current growth rate is estimated at 3.8% per annum and the district has an overall density of about 30 persons per square kilometre. This density varies considerably from over 100 persons per square kilometre in Central division to under 30 persons per square kilometre in parts of Kyuso, Eastern and Southern divisions.

One of the major factors which fuels the demographic flames in Kitui District is the high fertility rates. In 1969, the overall rate was in the range of 11.97 for the 30-39 age groups to a low of 7.96 for the age group of 25-29. In the 1979 census, the fertility rates were still high with a mean of 9.37 for the whole district. The current fertility is estimated at 8.

ANNEX 2

MACHAKOS DISTRICT

Machakos district stretches from Tsavo Park in the Southeast to just outside Nairobi in the West. It abuts Tana River to the Northwest and borders Kitui District to the east. It covers 14,156 square kilometres. The altitude ranges from 610 to 2088 meters.
Rainfall is bimodal and varies between 250-1250mm annually. It is highly unreliable particularly in the lowlands. The Athi River is the only permanent river in the district. It drains most of the district.

Machakos population was estimated as 102,000 in 1902. It has grown from 239,910 in 1932 to 366,199,in 1948 566,463 in 1962, 707,214 in 1969, 1,022,522 in 1979 and 1,587,000 in 1989. Annual Growth rates have been increasing all along as health services have improved and mortality rates dropped. Current population densities range from 30 to above 300 persons per square kilometre depending on the zone. The drier areas have less people and the wetter ones more per square kilometre.

Annual growth rates have bee 2.71, 3.17, 3.22, 3.76, and 4.1 for 1932-1948, 1948-1962, 1962-1969, 1969-1979, and 1979-1989. This explosion in the population has led to the redistribution of the population to the more arid areas of the district. Fuelling the population growth has been very high fertility rates. For the females aged between 45-49 the fertility rate for 1962 and 1979 were respectively 5.08 and 7.19. The latter is higher than the national average.

The main economic activity in Machakos as opposed to Kitui is smallholder crop farming. Only about a third of the district receives the 750mm minimum for cropping in a bimodal regime. Only a small part of the district is able to get 250mm each season for six out of ten years. In the lowlands, extensive livestock keeping systems are also threatened by the reducing land per capita and the poor, who loose their livestock, drop into crop agriculture.

Machakos farmers have organised cooperatives extensively. In 1987, 138,452 farmers were members of 54 primary cooperatives organised into a District Cooperative Union. Most of these were in coffee producing areas. In the drier areas crop agriculture is less developed and other than cotton, whose production is severely limited by marketing and variety constraints, there are no cash crops. However, given the average family size of 8, benefits from the cooperative movement were reaching close to 90% of the district population. The fifty four cooperatives had a subscribed share capital of Ksh. 18m (US$ 1m) and a turnover of Ksh. 465,651,776 (US$ 25,869,543).

Administratively, the district, under a District Commissioner, is divided up

into 37 locations, under a government employed chief. Locations are grouped into 8 divisions, under a District Officer.

ANNEX 3

TYPICAL ZONE 4 AND 5 FAMILY FARM

An average farm in Zone 4 and 5 would be composed of a family of eight. Chances are the father is a migrant labourer outside the district. The effective head of the household would therefore be the mother.

Land holding is likely to be between 5 and 10 hectares. About two of these would be cropped. The main crops are more than likely to be maize and beans, desired mainly for subsistence. Maize is not ecologically suited but given the fact that children are in school, there is not enough family labour to scare the birds which prey on the more suited millet, which is rare in the farming system. Other crops are likely to be pigeon peas, cow peas, green grams and squash.

It is possible that the family owns a plough. This is used for planting and for weeding. Row planting is practised so as to minimise weeding labour. Ploughing and planting are done after the rains for by so doing one cuts out the labour for weeding. Supplementary weeding is by hand hoe. The family is likely to have two draught oxen, two cows and about ten goats. The latter are important for they can be converted to cash. Some children are kept from school to look after the livestock during the cropping season. During the dry season, livestock are left to forage on their own. Increasingly, keeping children out of school to look after livestock is not socially acceptable. As a result tethering practices are increasing.

Cash for the family is scarce. The major need for cash is for school fees. Consequently livestock are sold when the fees are required. Typically this leads to poor prices. Cash is also brought home by the migrant labourers. This is irregular because of inflation. Consequently, the average family's economic condition is deteriorating. There is then the need to generate extra cash in the farming system without loading the family with extra inputs or labour. That is the place of simsim.

The farm is more than likely to have no terraces or other water harvesting structures. No agroforestry is likely to be practised. No organic manure is made on the farm. No nitrogen fixing trees are planted. The farming practice is thus essentially mining the soil.

It is not likely the farm is visited by extension agents for the roads are poor and the field staff offices far. Marketing of produce is essentially done by the mother carrying what has to be sold the three to five kilometres to the nearest market, where the local trader is likely to buy the produce at a price below the nationally regulated price for government is also far.

In summary, the farm has labour bottlenecks, problems in farming techniques, relevant crops, cash, knowledge and marketing.

ANNEX 4
MEAN ANNUAL RAINFALL: MACHAKOS DISTRICT

ANNEX 5
AVERAGE ANNUAL RAINFALL: KITUI DISTRICT

ANNEX 6
KITUI DISTRICT: COMMUNICATIONS AND DRAINAGE

ANNEX 7
COMMUNICATION SYSTEM: MACHAKOS DISTRICT

ANNEX 8

PROMOTION OF OIL CROPS DEVELOPMENT

LARRY NGUTTER
UNDP

1. INTRODUCTION

Oilcrops may be defined as plants cultivated for the purpose of producing vegetable oils for domestic use, manufacture of cosmetics and industrial use. In most cases, palm oil is a notable exception, the residue from the oil extraction process is a cake of relatively high protein content, which can be used for human food, fertilizer, and animal feed - the major use. However, there are important oils and cakes which are obtained as by products of other industries. Cotton cake, from the ginning of cotton seed for fibre; and maize oil, from the germ collected during maize-milling are examples.

Oils and fats form an important part of a balanced human diet. Traditionally, most Kenyans obtained their requirements from animal sources or through the direct intake of oil-bearing crops. The consumption of refined oils and fats is a relatively recent dietary habit among Kenyans, introduced after the arrival of the European and Asian cultures in Kenya. Indeed, vegetable oil/fat consumption in Kenya has increased only over the last two decades, rising from a per capita rate of 1 kg per year in 1970 to the present 5 kg. Consumption is, however, growing fast, and is projected to reach around 6 kg per capita in the next 10 years (see VOPS, Working Paper No. 8). Factors behind this rapid growth in vegetable oil consumption include: 1. the fast population growth rate, 2. changing of consumer tastes for fried foods and snacks, 3. urbanization, 4. less availability of animal-fat substitutes and 5. overall increasing family incomes.

The present per capita consumption suggests a national demand of about 110,000 metric tonnes (m.t.) per year taking Kenya's population to be 21.4 million people. Yet, Kenya produces only around 20,000 m.t. of edible vegetable oils per year. The balance is met from importation, mostly of palm oil. This importation of mostly crude (but sometimes refined) oil means that a significant portion of the by-product feed cakes also have to be imported. More importantly, the annual import bill of about Kshs. 2.0 billion for the vegetable oils plus a further Kshs. 0.5 billion for 3,000 m.t. of the feed cakes is a major drain on the country's foreign exchange. In fact, edible oil importation is the single largest bill for agricultural imports.

Given the above scenario, the case for Kenya to increase domestic production of oil crops becomes obvious. Apart from savings on the nation's meagre foreign exchange, such a policy could have these additional benefits:-

1. increase caloric intake from oil fats. Kenya's present per capita is well below the world average of 14 kg per capita per year;

2. greater availability of the animal feeds for the livestock industry (mostly dairy, poultry and pigs);

3. fulfilling Government's own stated policies of food security (see Food Policy Paper, 1981), narrowing of the gap in oil crops trade (Sessional Paper No. 1, 1986) and promoting off-farm employment opportunities form domestic processing (Sixth National Development Plan, 1980/93). Where processing takes place at farm, trading centre or village levels,l this would boost rural industrialization.

4. reduction of the uncertainty connected with dependence on foreign suppliers and markets which are characterized by volatility and inelastic supply (thus small reductions in output, say from bad weather or protectionist policies of producers, lead to greater than proportionate increases in prices). To the extent that Kenya's national import is only a small fraction of the world trade in this commodity, we are "price-takers".

2. POTENTIAL FOR OIL CROP PRODUCTION

Available information suggest that practically each district in Kenya has the ecological potential for one oil crop or another. Coconuts dominate in the Coast Province, where they grow naturally, while groundnuts are grown mostly in the Lake Victoria Basin districts apart form smaller amounts in Meru and Embu districts. Simsim is again prevalent in some Coastal Districts (Kilifi, Kwale and Lamu) and in the Western Province (Bungoma and Busia). Sunflower has a much wider ecological distribution but is more prevalent in Eastern Province (Machakos, Kitui, Embu, Meru), and in the lower elevations of Kirinyaga and Bungoma Districts. Cotton seems to follow a similar pattern, while rapeseed is mainly a high potential area crop, where it can actually compete with wheat and barley, depending of price regimes. Castor oil is grown in the more arid districts of Eastern Province, Kitui included.

Estimates of the total area planted to some of the crops are given in Table 1 below.

Table 1
ESTIMATED HECTARAGE UNDER VARIOUS OIL CROPS

Oil Crops	Area (ha)
Cotton	45,000
Sunflower	42,000
Groundnuts	39,000
Coconut	35,000

Rapeseed	4,700
Simsim	4,600
Soyabean	2,000
Castoroil	n.a.
Total	176,000

Source: VOPs, op.cit

It is important to point out the unreliability of some of the above hectarages, which additionally mask very great variability from year to year. However, the important point is that Kenya has the potential for the production of both annual and perennial oil crops. Except in the case of rapeseed, this potential is to be found in the Arid and Semi-Arid Lands (ASAL) simply because current land holdings tend to be larger and also because of unavailability of alternative high-value cash crops. Most of the cultivated land in the higher rainfall areas which can be allocated to non-food crops is already under high-value cash crops such as coffee, tea, pyrethrum and horticultural crops.

3. CONSTRAINTS OF OIL CROP DEVELOPMENT

Why has not a thriving domestic oilcrop industry developed in Kenya? Basically because of the availability to the processing industry of very cheap alternatives in form of imports, combined with a lack of a clear public policy for the industry.

1. Prices of Imports.

Of the 90,00 m.t. of vegetable oil which Kenya imports, about 80,000 m.t. is palm oil. Why the dominance by palm oil? Well, the international prices of this commodity (as actually is the case for other major vegetable oils like rapeseed, soyabean and sunflower), has been on the decline since 1983, when they peaked. Between 1983 and 1988, the prices declined as indicated in Table 2.

Table 2
INTERNATIONAL PRICES: FOUR MAJOR OILCROPS 1983 & 1988 US$/M.T.

Crop	1983	1988
Rapeseed	696	297
Palm oil	767	310
Soyabean	722	324
Sunflower	765	354

Source: VOPS, Working Paper I.

Thus, the oil industry imports the second cheapest vegetable oil. Moreover, palm oil contains saturated fatty acids (and is therefore dietetically less wholesome) which means that only minimal hydrogenation is necessary to turn the oil into fats and thus increase the shelf-life of the final product. Further, due to the public policy of "protecting the consumer"(mainly the urban consumer), the Government has been reluctant to impose any restrictions on palm oil imports and, when any duty has been imposed on the imports, the Government, which partly owns the largest processing plant, gives 100% remission of the duty to the processor.

This subsidization provides no economic incentive to the processing industry to support domestic production of alternative oil groups.

The declining price of the imports has afforded the processing industry substantial profits. Margins have even remained high, when the price of the final product to the consumer has remained nearly constant or even have declined.

The following table compares the estimated variations in the imported prices of palm oil (including import duty) to the price of Kimbo (the best selling vegetable fat.)

Table 3
LANDED PRICE OF PALM OIL VS PRICE OF KIMBO 1982 to 1986

Price of (Ksh/kg)	1982	1983	1984	1985	1986
Palm Oil	16.90	12.80	10.00	10.00	8.00
KIMBO	17.50	18.80	20.50	21.00	22.50
Margarine	10.60	6.00	10.50	11.00	14.50

This table reinforces the conclusion above.

In fairness to the industry, it should be pointed out that in the late 1970's, the Oil Crop Development Ltd. (a subsidiary of EAI) did attempt to promote the production of sunflower (among others) by distributing free seeds, fertilizers, and offering oil crop-targeted extension service. However, this effort was stymied by new entrants into the processing industry, who out-paid OCD, the new entrants not having incurred promotional costs. As a result, OCD stopped the promotional effort.

2. Domestic Prices of Oilcrops

At present, the prices being offered for oil crops average less than Ksh. 3.00 per kilo to the farmer. Estimates suggest that a price in the region of Ksh.

4.00 per kilo to the farmer would make oilcrops competitive with other crops. (As a matter of fact, lack of studies on the economics of oil crop production data visa vis other crops is one constraint on its own right). Compounded by the low production per unit of land (low level of technology) the returns to oil crops do not provide a suitable incentive to farmers. More fundamentally, delays in payment by buyers, including co-operatives, has worsened the situation. Cotton production has been one of the most affected crops.

3. Public Support to Producers

Public support to farmers has been weak for all oil crops. Research has been confined to research station (mostly Njoro PBS), so that the oil content of crops being farmed is still low by international standards. This further affects price to producers. Only now are oilcrop extension officers being assigned to districts as a result of the UNDP/IDA supported Oil Crops Development Project. While the NCPB used to have the mandate for the purchase of many oil seeds (sunflower, simsim, castor), NCPB's basic concern was understandably on food grains and pulses. Other inputs such as quality seeds, credit, storage facilities etc have been equally inadequate; as has been market information.

4. Processing Capacity

The installed processing capacity in the country is far in excess of the oilseeds available. There is a lot of idle capacity. This situation has an indirect effect on the prices paid to the farmer and/or by the consumer; as processors try to cover the idle capacity costs from either low prices to the farmer or higher prices to the consumer. While complete data is hard to come by, the following table on three important oilcrops is illustrative:

Table 4:
PROCESSING CAPACITY UTILISATION FOR THREE OIL CROPS 1988

Crop	Installed Capacity (m.t.)	Utilized Capacity (m.t.)	Utilization (%)
Cotton:			
Seed	71,600	12,650	18
Cake	29,911	5,384	
Sunflower:			
Seed	65,620	21,600	33
Cake	24,430	8,062	
Copra seed:			

Seed	20,820	12,820	62
Cake	8,271	5,128	

Nearly all of the above capacity is in major towns (Nairobi, Mombasa, Nakuru, Kitale). This means that when the oilseeds are produced, they have to be transported first to the towns for processing; then the oils/fats and feed cakes are re-transported to the rural areas for consumption. This double transportation has led some people, mostly charitable organizations and church groups, to start rural processing of oilcrops. This has however, brought about its own problems including:lack of sufficient seed, lack of sufficient markets for the oils and cakes, uneconomical oil extraction due to the low efficiency of equipment being used, farmers unaware of cake utilization (some cakes can be harmful to livestock if not handled with care). Most of livestock in ASAL is still Zebu with low yield potential, natural pastures are fairly plentiful in ASAL). In addition, these well-meaning organizations came face to face with constraints discussed under 1 to 3 above. Thus, most of the processing machines have been non-operational.

4. INTERVENTION THROUGH COOPERATIVE MOVEMENT

In summary, the major constraints in the oil crop industry are:

1. Public Policy
Unnecessary Government protection of the urban consumer, and by extension of the dominant oil processor through inappropriate tariff and price policies which allow for importation of cheap crude oils.

2. Production
Inadequate research and extension services, lack of inputs including quality seeds, credit and disease control measure, low gross margins, delayed payment to farmers.

3. Processing
Inappropriate post-harvest and processing technology in rural areas, side by side with overall national capacity, shortage of raw materials.

4. Marketing
Underdeveloped markets for rural processed oils and cakes, lack of market information and well-organized market outlets, lack of basic market infrastructure such as storage and transport, excess capacity installed,

Can the above constraints be addressed through the co-operative system in a district like Kitui?

Kitui is a typical ASAL district. Of the land area totalling 31, 099 sq. km

(including some 6,309 sq.km in the Tsavo National Park) 2.2% is classified as high potential (read " high rainfall") area; 36.6% as medium potential; and the rest, 61.2% as low potential. Rainfall regimes are respectively 762 to 1270 mm; 500 to 800 mm and below 500mm per year.

From these dry, unreliable rainfall, high temperature and high evaporation rate conditions, one may deduce that the suitable oilcrops would be castoroil, sunflower, perhaps simsim, and cotton.

In 1990, membership to the co-operative movement in Kitui district was estimated at 13,176 people only, out of an estimated district population of just over 660,000 people. Thus Kitui has only 2 % of the district population and 1% of the national co-operators' population in the co-operative movement. (District Development Plan, 1989/93). Thus, the mobilization of the people through the co-operative movement is currently very minimal. Their activities are concentrated in the Central and, to a lesser extent, in the Mwingi and Kyuso Divisions. Agricultural production is low due to the low rainfall. Therefore agro-marketing societies are not as active as the urban-based savings and credit societies. Of the registered societies, 24 are dormant (op. cit). the full picture is depicted in table 5 below.

Table 5:
COOPERATIVE ACTIVITIES IN KITUI DISTRICT 1988

Activity	Active	Dormant	Total	Share Capital(Ksh.)	Membership
Cereals/grains	6	11	17	425,000	1,086
Coffee	2	-	2	20,000	780
Cotton	-	1	1	3,100	385
Fruits/vegetables	2	-	2	10,000	120
Sisal	-	1	1	2,000	100
Marketing/other crops	2	1	3	51,000	715
Eggs & Poultry	2	-	2	4,000	60
Ranching/Livestock	5	4	9	13,000	2,354
Multipurpose	2	-	2	80,000	750
Consumers	1	1	2	22,000	338
Housing/Savings	1	-	1	n.a.	n.a.
Credit	8	2	10	18,000	5,800
Craftsmen	2	1	3	33,500	285
Miscellaneous	2	1	3	n.a.	n.a.
District Union	1	-	1	20,000	158
Others	1	-	1	24,000	158
Total	32	24	56	695,600	13,076

Problems identified for the high rate of dormancy (Socio-Economic Profiles:Kitui 1990) are:

1. Lack of finances
2. Lack of training/education for co-operators and officers
3. Lack of skilled manpower
4. Lack of infrastructure (stores and transport for produce)
5. Poor prices, especially for cotton
6. The low rainfall, leading to low production of relevant crops

Combining now the national constraints to oilcrop development, the oilcrops suitable for Kitui district and the above profile of the cooperative movement in Kitui, we can make the following conclusions:

1. Production Constraints

Effort towards Co-operative Management Improvement would enable Kitui cooperatives to procure inputs (seed, fertilizers) in bulk for the benefit of members. Given the small quantities per producer, cooperative marketing, if revamped, offers economies of scale in the procurement of storage and transport facilities. This would particularly benefit all oilcrops.

2. Processing constraints

With improved oil extraction equipment (research is now underway in the UNDP/IDA project) farm and trading centre level processing of edible sunflower oil may become viable, targeted to Kitui, Mwingi and Mutomo townships; or to Rural Service centres like Matinyani, Kisasi, Miambani, Ikutha, Mutitu, Migwani and Kyuso. A feasibility study on the use of the oil in local hotelis (for cooking chapatis, samosas maandazis etc) in these and the 16 smaller trading centres would be necessary.

3. Marketing

Strengthened co-operatives would have more muscle in dealing with the district monopoly buyers (Kitui ginnery owners and the Bajabar Ltd. among others) of cotton, castor oil and sunflower. It might be possible for a stronger co-operative to by-pass the middlemen altogether and establish their own processing as is the case in other districts. Where the cooperative movement has become a major actor in the market, farm gate prices have improved.

Other permutations are possible. However the national public policy on oilcrops delayed payments to farmers and the low prices are the most important constraints which no district level cooperatives can tackle adequately.

4. Farm Level Utilization

This is feasible particularly where intensive systems of livestock production are possible. The use of oilseed cakes to improve animal nutrition would in turn increase milk yield in the dairy industry. Possibilities may also exist for increased poultry production. These are possibilities which need to be investigated at district level.

ANNEX 9
CURRICULUM VITAE OF PRINCIPAL SASOL STAFF

1. JAAP VAN DER VAN DER ZEE

Profession: Resources Development Specialist
Date of Birth: 12-08-1945
Nationality: Dutch

Key Qualifications:

Mr. Van der Zee has worked for many years in a variety of rural development projects in various parts of the world. Over the last few years, Mr. Van der Zee coordinated the Kitui Integrated Development Programme in Kenya. Most of the activities of Mr. Van der Zee involved development of agricultural and livestock production, soil conservation and the development and application of land information systems. He has been responsible for the planning and formulation of rural development programmes in Kenya, Colombia and Burkina Fasso. Mr. Van der Zee has published over 30 papers dealing with soil conservation, erosion and rural development planning and the application of land information systems.

Education:

1965 Ing. Degree, State Tropical Agricultural College, Deventer, The Netherlands

1968 BSc. Degree, Land and Water Resources, Agricultural University, Wageningen, The Netherlands

1973 Bsc. Degree, Geology, Queensland University, Australia

1978 MSc. Degree, School of Australian Environmental Studies.

Experience Record:

1966-1972 Research assistant chemical crystallography, Department of Chemistry, Queensland University. Crystal structure determinations and translation of papers for the "Yearbook of Inorganic Chemistry".

1973 Geologist, Thiess Brothers Pty. Ltd. Blackwater and Bijoela coal mines, Northern Queensland. Exploratory drilling and related mapping.

1974-1978 Soil conservationist, Queensland Department of Primary Industries, Australia. Studying relationship between land use and soil erosion, soil water relationship under traditional cropping practices, opportunity cropping, strip cropping and stubble mulching under sub-humid and semi-arid tropical conditions. Geological, geomorphological and soil mapping.

1978-1982 Team Leader of a rural reconstruction and development programme on the island of Santo Antao, Cabo Verde. Soil conservation projects, flood control measures, and reafforestation projects.

Project formulation and related research programmes.

1982-1983 Planning and formulation of rural development projects in Cabo Verde and Burkino Faso, with emphasis on soil erosion and water conservation. Guest lecturer in soil and water conservation at the Agricultural University of Wageningen, Delft and The College of Tropical Agriculture in Deventer.

1983-1986 Co-ordinator of a Dutch funded integrated rural development programme in the province of Choco, Colombia, as well as coordinator of a separate programme regarding infrastructural improvements (roads, electricity, watersupply) in the same province.

1986-1989 Co-ordinator of a integrated rural development project in the province of Choco, Colombia (Phase II). Land evaluation and applications of Land Information Systems. Erosion control and soil conservation through appropriate farming systems. Soil conservation measures and reafforestation programmes.

1989-1991 Coordinator Kitui Integrated Development Programme, Kenya. Resource rehabilitation and improvement through catchment approach in coordination with MoA, MoLD, Forest Department, MoWD, MoCSS and the DDo`s office. Land use planning and the construction of water points for human consumption and livestock consumption.

Languages:	speak	write	read
Dutch	mother tongue		
English	exc.	exc.	exc.
French	good	good	good
Spanish	good	good	good
German	good	good	good
Portuguese	good	good	good
Kiswahili	fair	fair	fair

2. SAMMY MUTHOKA MUTISO

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DATE OF BIRTH: 14th February 1945

PLACE OF BIRTH:Kangundo, Machakos District

EDUCATION: BSc. University College Dar-es-Salaam (Chemistry, Biology and Economics) 1969.

Post Graduate Studies, University of Nairobi (Soil Science, Biochemistry Plant Physiology)
Research Topic: Carbohydrates of the Coffee Bean.

MARITAL STATUS:Married. 3 Children

CONSULTING EXPERIENCE:

MUTICON, Kambiti Farm: Water in Capitalising ASALs. 1991.

DANIDA/MUTICON Sustainable Agriculture in ASALs. 1990.

National Council of Churches of Kenya, Community Food Security Planning. 1990.

N.C.C.K., Community Environmental Care and Preservation. 1990

Mazingira Enterprises Landscapers Feasibility Study & Business Plan Development. 1990

Jua Kali Organisation Mombasa, Exhaust Systems Fabrication Feasibility Study. 1990

National Council of Churches of Kenya, Community Food Preservation and Storage. 1990.

National Council of Churches of Kenya, Development of Food Security Functional Education Material manuals on:

Bio-intensive Gardening.

Fruit and Vegetable Preservation.
Grain Preservation and Storage.
Crop Rotation.
Plant Food Absorption by Plants.
The Structure of Soils.
The Impact of Cultivation on Environment.
Methods of Erosion Control.
Sustainable Agriculture and Resource Base Protection.
Nutrition. 1990.

EMPLOYMENT EXPERIENCE:

1989-1990 Food Programme Consultant National Christian Council of Kenya.

1976-1986 Chief Chemist Kenya Shell - Responsible for Laboratory analysis of all Kenya Shell Products. Supervised 5 Technical Staff.

1974-1975 Jos-Hansen and Soehne - Commercial Assistant in the Pharmaceutical Department - Responsible for marketing of drugs sold by the company.

1969-1972 Quality Control Chemist Coffee Research Foundation. Responsible for three Technical personnel.

BOOKS PUBLISHED: Revision Physics - Nairobi, Heinemann Educational Books 1989.

Physics 1 & 2 in press
Physics 3 & 4 in press
Essential Physics in press
Essential Chemistry in press
Chemistry 1 & 2 in press
Chemistry 3 & 4 in press

ARTICLES PUBLISHED: "PH Variation in Coffee bean and its possible relationship to organoleptic acidity." Nairobi, Kenya Coffee 1969.

"The influence of water contaminants in processing water on bean quality in preparation". Nairobi, Kenya Coffee 1970.

"Yellow Cherry" Nairobi, Kenya Coffee 1970

"Comparison of washed and unwashed Coffee in processing." Nairobi, Kenya Coffee 1971.

"Evidence for the presence of protopectins in the Coffee bean". Nairobi, Kenya Coffee 1972.

"Density characteristics of Kenya Arabica Coffee and its application in Coffee grading in the factory". Nairobi, Kenya Coffee 1972 (with A.E. Wootton).

ANNEX 10
SASOL PROFILE

ANNEX 11
MACHAKOS DISTRICT COOPERATIVE UNION LTD. DATA

1. BACKGROUND

The Machakos District Co-operative Union Ltd. was established under the Co-operative Societies Act in 1964, mainly to handle matters concerning coffee production and marketing. Over the years, the union has expanded to become Multi-purpose and currently (1990) has 51 affiliated societies> These are:

- 13 Coffee Societies
- 22 Cotton Growing Societies
- 2 Handcraft Societies
- 2 Horticultural Societies
- 1 Dairy Society
- 9 Ranching Societies
- 1 Wattle Bark Society
- 1 Multi-purpose Society
- 1 Women Group Society

Total - 51 Societies

There are other societies which are not affiliated to the Union. The total number of societies in the District is in excess of 100.

Although the Union deals with affiliated societies, it also deals with the general public and particularly the farming community by way of delivering farm inputs/requirements for cash sales to the nearest store possible as well as providing cash market at the official Government prices for their produce. This encourages them to deal with the Union through the respective society stores and avoid exploitation by middlemen.

Collaboration:

The M.D.C.U. Ltd works in close collaboration with all Government Ministries and in particular the ministries of Agriculture, Livestock Development and Co-operative Development. The Union has also close links with NGOs and other related organizations and is fully represented at all levels of the District Administration especially the District Development Committee and District Agricultural Board.

The M.D.C.U Ltd. Management

The policy management of M.D.C.U Ltd. rests with elected committee members drawn from all the affiliated societies. During elections, all affiliated

societies are invited t elect Management Committee members to represent each sector of production.

The day-to-day management of the M.D.C.U rests with the General Manager, employed by the organization and supported by senior and support staff who form its backbone.

2. ACTIVITIES OF THE UNION

The Union's activities have been growing over the years to cater for the members needs. Currently, there are 8 activities, whose turnover as at 30 September, 1990 (unaudited) were as follows:-

	Ksh.
1. Cotton and Cereals	6,601,599.00
2. Transport Section	8,080,141.00
3. Banking Section	17,732,700.00
4. Stores Section	16,938,610.00
5. Import/Export Section	8,744,691.00
6. Maize Mill	29,782,692.00
7. Nurseries	842,546.00
8. Union General	5,762,029.00
	92,879,008.00

Functions of the Sections

2.1 Cotton and Cereals Section

This section was started in early 1978 to cater for cooperators and farmers in general from the Semi-Arid areas of the district where co-operatives were rather weak. With support from the Government, 22 societies have been formed and affiliated to the union. Farmers have benefitted from their cooperatives by acquiring their farm input requirements nearer them and at fair prices. Sales of cotton since 1977 has been handled by the Cooperatives to the farmers satisfaction (see appendix 1). The area also produces cereals and pulses which have been bought by the Union and societies as agents of the Government.

Maize production and marketing is set to increase since the Union acquired a Maize Mill at Athi River whose capacity is 90 metric tons (312,000 bags per annum). This is an extra marketing channel which shall boost the farmers morale.

2.2 Transport Section

The Transport Section was created in 1983 and has been very useful in

transporting cooperators produce all over the district. Cotton produced in the district is handled 100% by the Transport Section. It has assisted in delivering coffee to K.P.C.U. (Nairobi) from societies which do not own any or need assistance to their existing transport. Recently after acquiring the Maize Mill, our lorries have been transporting raw materials and finished products in and outside the district.

Delivery of farm inputs to various societies is another important function of the Transport Section. Cooperators and the public in general enjoy the benefit of the proximity of these inputs, which does not happen outside cooperatives.

2.3 Banking section

The Banking Section started in 1972 and has grown from a tiny hall in Machakos to four other spacious branches (three in coffee areas and one in cotton areas) right in the rural areas. There are regular mobile services to areas where these services are required.

Cooperators who otherwise could not open accounts in Commercial Banks have been encouraged to save. It is encouraging to note that savings as of September,1990 were Ksh. 73,917,825.38.

The Banking Section has been giving out loans to the members. The most important loan in the recent years has been the fees loan. This scheme however is limited to coffee farmers only where coffee is used as security to the loan. Ways and means are being studied on how other cooperators could benefit from this loan scheme. The highest loan for school fees issued was 10 million in 1989 and there is a likelihood of exceeding this figure in future. The source of the funds has been farmers own savings and efforts shall be made to encourage more savings to enable more loaning schemes.

Other loans from the bank include C.P.C.S. where farmers borrow to improve their coffee production (See appendix 2).

2.4 Stores Section

The Stores provide farmers, both in the cooperative sector and others, with essential farm inputs. There are stores all over the district to cater for their needs. In recent years the stores have imported fertilizers and coffee chemicals direct from the manufacturers abroad which made these inputs cheaper to the users.

2.5 Import/Export Section

This section was started in October, 1988 and has mainly been dealing with exports of horticulture and handcrafts. During its short period of existence, the section has exported 339.6 tons of horticultural crops worth Ksh, 7,880,804. Main markets have been Britain and Netherlands. The union is actively pursuing the possibility of exporting the same crops to the Nordic countries. Ours is the only co-operative in the export trade among over 140 registered exporters in the country.

Handcraft from the district has been exported to most continents of the world (Europe, America, Australia). Many people, in particular women, in the district have benefitted from this trade.

2.6. Maize Mill Section

This section is strictly the property of individual share holders and the union and was started in 1988. It became operational on 11/7/88. It was started to meet the needs of cooperators in the district by opening extra marketing channels for excess maize as well as serving the district in as far as maize flour is concerned.

In the long term plans, it is expected that the plant shall be able to manufacture animal feed and strengthen the dairy industry in the district. The performance of the Maize mill since it started operations is shown in Appendix 3.

2.7 Nurseries Section

Nurseries have mostly been serving coffee farmers by raising seedlings. The farmers have also been able to get a limited number of citrus trees raised by nurseries. Of late, the Union's emphasis on nurseries has shifted to other tree crops as all societies are now in a position to raise their own coffee seedlings. Nurseries are crucial in supporting the horticultural sector by raising the required seedlings. Some research carried out recently by the Horticultural Crops Development Authority has shown that a zone stretching from Yatta Plateau to Kibwezi is very suitable for production of citrus fruit, mangoes and avocadoes. The union has already taken over some fruit nurseries previously run by the Ministry of Agriculture and these shall be used to meet demand on these tree crops.

Coffee production ins the biggest single activity handled by Cooperators in the district. Turnover for the 13 Coffee affiliated societies in the last 5 years is shown in Appendix 4.

P.M. Musyimi
Ag. General Manager

Appendix 1: Growth of the Union Banking Section 1987-1990

Items	1987/88	1988/89	30/9/1990	SAVERS/LOANERS
a. Members Savings	55,955,782	7,446,172	73,917,825.38	87,086
b. School Fees Loans	7,906,660	10,210,418	15,695,558.05	5,431
c. C.P.C.S.	251,635	4,397,509	10,890,000.35	1,292
d. Members	80,192	33,464	84,870.00	

Service rendered to Members

1. Mobile Services to Society Members
2. School Fees Loans
3. C.P.C.S. Short Term Loans (18 months)
4. Crop Advances to Societies
5. Interest on the Members Savings Accounts
6. Maintaining both Savings and Credit Personal Cards
7. Members Education and the like

Appendix 2: Summary of Cherry/Mbuni Turnover 1989/90 Year

Society Name	Coffee Sales Ksh.	Mbuni Sales Ksh.	Turnover Ksh.
01 - Kilalani	9,285,281	741,318	10,026,599
02 - Mitaboni	17,644,488	2,160,152	19,804,040
03 - Mbilini	11,565,833	1,124,498	12,690,331
04 - Kitwii	11,432,301	1,232,510	12,664,811
05 - Kikima	18,423,939	2,042,497	20,466,436
06 - New Iveti	41,557,499	7,465,631	49,023,130
07 - Matungulu	33,928,395	3,302,454	37,230,849
08 - Kakuyuni	11,402,590	1,505,493	12,908,083
09 - Muputi	2,142,183	676,796	2,818,979
10 - Mua	563,935	94,274	655,209
11 - Muisuni	8,009,691	577,324	8,586,915
12 - Kithumani	1,256,071	212,467	1,468,538
13 -Kithangathini	10,107,117	800,392	11,907,509

	Ksh.
1988/89	358,853,174
1989/90	200,252,029
Difference	(58,601,145)

Difference in % 22.64%

Appendix 3: Cherry Production for the Last Three Years

Societies Name	1987/88	1988/89	1989/90	Total
1. Matungulu F.C.S	7,051,632.5	9,121,081	4,366,689.5	20,549,403.0
2. New Iveti	8,098,017.5	6,515,062	5,549,809.0	20,072,888.5
3. Kakuyuni	1,964,895	2,953,718.5	1,479,609	6,398,313.5
4. Kitwii	2,236,435	2,862,972	1,461,583	6,560,970.0
5. Kikima	3,542,566	3,519,945	2,368,044	9,430,556.0
6. Mitaboni	2,996,383	2,903,071	2,328,086	8,227,540.0
7. Mbilini	2,870,281	2,947,947	1,552,184	7,370,412.0
8. Kilalani	2,009,209	2,380,128.5	1,145,212	5,534,599.5
9. Muisuni	1,691,162	2,318,703	1,120,486	5,130.321.0
10.Kithangathini	2,092,675	1,951,460.5	1,405,512.5	5,449,648.0
11.Muputi	353,420	444,028.5	264,386	1,061,834.5
12.Kithumani	26,268	243,849	173,691	681,808.0
13.Mua	80,298	82,614	78,433	241,345.0
	35,171,243	38,244,630	23,293,765	96,709,638

Variance

	Kgs.
1988/89	38,244,630
1989/90	23,295,765

Difference (14,950,865) = 39.09%

Appendix 4: Cotton Production for the last Thirteen (13) Years

Year	AR	BR	Gross Value	Net Value	%
1977	1,203,603.5	686,283.5	5,013,722.95	3,887,189.00	77.5
1978	3,751,150.5	552,746.5	13,881,673.60	9,991,672.00	72.0
1979	5,298,925.5	1,121,084	20,717,039.65	15,903,282.90	76.8
1980	3,140,448	68,980	12,257,116.00	9,920,736.00	80.9
1981	4,160,966	550,727	15,943,153.00	12,168,175.00	76.3
1982	3,147,091	293,928.5	12,476,483.00	10,072,505.00	80.7
1983	4,544,999	341,391.5	20,277,487.00	17,148,622.00	84.6
1984	2,002,062	141,094	9,934,416.00	8,830,681.00	88.9
1985	6,158,755	1,371,000.5	34,152,726.00	27,101,271.00	79.4
1986	1,958,345	440,254	10,870,348.00	8,807,817.00	81.0
1987	1,121,992	259,997.5	6,246,953.00	4,810,516.00	77.0
1988	1,358,132	317,112	9,100,129.00	7,106,628.00	78.1
1989	1,462,516	460,871	10,157,709.00	8,927,798.00	87.9
1990	932,202	270,648	10,675,260.00	8,728,301.99	81.8

Appendix 5: Maize Mill Data

1987 -1990

1. Shares: (Ksh.)	
As at 31st July, 1987	1,785,000.00
To date 31st March, 1990	8,970,463.10
To date 31st December, 1990	9,129,203.10
2. Loan	
Actual given	26,644,906.65
Repayment	7,728,065.05
Balance to date	18,916,841.60
3. Sales	
For the period 30/10/89 to Sept. 1990	30,618,005.00
October 1990 to December, 1990	1,692,528.50
4. Purchases	
Upto 30/9/89	3,657,710.00
Oct. 1988 - Sept. 1990	17,312,297.90
Oct. 1989 - Sept. 1990	19,722,106.20
Oct. 1990 - Dec. 1990	3,024,980.00
5. Current price per bag	300.00
6. Capacity per day	300 bags/ One shift
7. Fixed Assets	
Land - Athi River	105,257.00
Land and building - Factory site	4,500,000.00
Plant and machinery	18,500,000.00
Office equipment	183,068.50
	23,288,326.10
8. Major Operating Expenses	
a. Salaries	
Upto September 1988	51,818.60
1/10/88 to 31/9/89	407,446.75
1/10/89 to 10/9/90	487,738.05
1/10/90 to 31/12/90	162,573.95
b. Casuals	
Upto September 1988	84,450.15
1/10/88 to 30/9/89	432,848.60
1/10/89 to 31/12/90	531,678.45
1/10/90 to 31/12/90	100,312.30
	1,209,289.50
c. Production and Marketing	
(Includes Packaging Materials and Transport)	
Upto 30/9/88	936,003.15
1/10/88 to 30/9/89	4,463,930.60
1/10/89 to 30/9/90	4,265,412.05
1/10/90 to 31/12/90	580,839.65
	10,246,185.45
d. Depreciation	

Upto 30/9/88	-
1/10/88 to 30/9/89	1,558,984.00
1/10/89 to 30/9/90	1,555,000.00
1/10/90 to 31/12/90	303,246.00
	3,417,230.00