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GOAT AND SHEEP PROJECT CONSULTANCY

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MUTISO CONSULTANTS LTD

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1. GASP RANCH; LAND STATUS AND LOCATION

1.1. LAND STATUS

Ranch development is a long-term activity. As a result it is always important to clarify the status of the land for no long-term investment decisions can be made if the ownership of the land is in doubt.

We have found that the status of the land for the GASP land somewhat unstable and since we think clarification before further investment is important we lead with discussion on the land status issue.

The land on which the Diocese of Kitui Goat and Sheep Project (GASP) is located was leased from Mikuyuni Cooperative Society Ltd. for the period from 22/6/1978 to 31/8/1987.

On its part the Mikuyuni Cooperative Society Ltd. was granted a 20 year lease on L.D. Plan Number 76151/8A of 21,600 acres effective between 1/9/1967 and 1/9/1987.

We have not been shown evidence by Kitui County Council, who act for the Commissioner of Lands, that the lease for Mikuyuni Cooperative Society Ltd. has been extended. However, it is common knowledge in Kitui that part of the land originally leased to Mikuyuni Cooperative Society Ltd. had been excised and given to Akimbo Agricultural Institute (Ukai) as early as 1975. In the past two years, other parts of the original land parcel have been given to a proposed teachers college and a polytechnic.

There is some confusion on whether the lease for the GASP land, which initially had been drafted to run from 1977 to 1987, was extended to 1988 for it did not come to force on until 1978. This may now be an academic question for even if the original lease for Mikuyuni Cooperative Society Ltd. was extended, the Diocese does not have a current lease with the cooperative.

Discussions with Diocesan Development Office (DDO) officials indicated that the ranch was leased to the Catholic Diocese since Mikuyuni Ranching Co-operative Society Ltd. was unable to pay the lease fees to the Kitui County Council, for their whole holding of 21,600 acres to Kitui County Council. It is interesting that the lease fees paid by the Diocese were for all the 21,600 acres in spite of the fact that GASP was leased only 5,000 acres of unsurveyed land.

1.2. RANCH LOCATION

The ranch location and its environs are shown in Map 1.

a. The land is in Yatta B2 location of Kitui District.

b. It borders Mikuyuni Cooperative Society Ranch to the south,

UKAI to the west, Mwakini Ranch to the north and smallholder settlements to the northeast and some government reserve land to the east.

c. The border with UKAI is quite straightforward since the road is the boundary;

d. The border with Mwakini is somewhat in dispute and needs to be agreed upon between the two parties. The Chairman of Mwakini Ranch claims he has an official Kenya Survey map showing the boundary. This is disputed by GASP.

1.3. RECOMMENDATIONS ON LAND STATUS

Given the above discussion several we would like to make the following recommendations, which in our opinion a key in solving the land status issue.

1.3.1. Given that the request to start the GASP Project emanated from Kitui District leaders, who saw the need to bulk improved animals for the people of Kitui, a need which will continue for at least the next twenty years as identified in the DANIDA Kitui ASAL Formulation Mission, we strongly recommend that the Diocese take up the issue of its being allocated the land with the DDC.

1.3.2. Since the Kitui County Council is part and parcel of the DDC, under District Focus for Rural Development practices, any residual interests it may have should be ascertained and discussed with the DDC.

1.3.3. Given that the GASP project paid lease fees for all the land belonging to Mikuyuni Cooperative Society Ltd. and the further fact that Mikuyuni Cooperative Society lease appears to have expired, GASP should get title to the land without intermediaries or encumbrances.

1.3.4. Further, given that GASP has invested extensively on land improvement and construction of physical facilities, it, under normal land improvement practices, is entitled to getting the land deeded to them by Government.

1.3.5. We strongly recommend that the Diocese obtain freehold title to the 5,000 acres to be used exclusively for the purpose of producing improved animals and offering training to people of Kitui on livestock production. This will involve the DDC and County Council making such recommendations to the Commissioner of Lands.

1.3.6. To speed up the process process of granting title to the Diocese, we recommend that the DDC and the County Council authorize the surveying of the land by Kitui based officials as soon as possible. If this professional service can not be offered immediately by the officers in Kitui, we strongly recommend to the Diocese that they arrange to get the land surveyed commercially for purposes of issuing title.

1.3.7. Even before formalizing the legal status of the land, it is important to settle conflicts over the boundaries. In any case this needs to be done before a surveyor is put to work. The Diocese, the Office of the DC as well as the County Council, ought to establish working boundaries for there are disputes on who is grazing on whose land especially on the Mwakini Ranch side and the northeastern side where there is encroachment by smallholder settlers.

1.3.8. Proper ranch fencing, especially on the Mwakini side, the Eastern boundary, near which the important water reservoirs are being constructed, should be constructed after the boundaries are fixed administratively initially and formalized by an official survey.

1.3.9. The Nduyu dam site, which is the major water source, should be fenced using appropriate materials.

2. GASP RANCH'S NATURAL POTENTIAL

2.1. THE LAY OF THE LAND

The GASP ranch is located on the Yatta plateau. The general elevation of the farm is 3000-4000 feet above sea level. The land slopes southwards and is dissected by the tributaries of the Mikuyuni River. It is important to realize that the term river in Kitui District refers to big water courses which may flood during rains but are generally dry during most of the year. A more correct term would be donga. Dry river beds generally full of sand is a general feature of the water courses in the region. Water is obtained through either damming of the tributaries of the Mikuyuni River or wells in the same river.

2.2. THE SOILS

The soils of the ranch vary from the sandy light brown soils to red soils (especially around the offices). Large parts of the riverine area is covered by black cotton soil (Montmorrilonite).

2.3. THE TREE/SHRUB SPECIES

The general vegetation includes various species of Acacia genus, the most predominant being A. mellifera, A. senegal, A. tortilis and A. drepanolobium. These are interspersed with commiphora spp e.g. C. africana, C. riparia and C. baluensis. There are a few Combretum, Grewia and Terminalia spp which are handy in the farm for building purposes. An important plant for browse and boma construction is Premna oligotrichia.

The ranch is quite bushy in some areas, especially towards the southwest where A. mellifera makes an impenetrable thicket. A few resident buffaloes hide in the thickets.

2.3. THE GRASS SPECIES

Grasses include Aristida Keniensis, Enteropogon contortus, Chloris roxburgiana and Cynodon dactylon.

3. EXISTING FARM IMPROVEMENTS

3.1. PERMANENT BUILDINGS

The farm has quite good housing for the manager, training officer and the herdsmen who live too far away from their homes. It has also classrooms, dining space and dormitories for 16 course participants. It is our impression that these permanent buildings are enough sufficient for any training programs and thus we do not recommend construction of others.

3.2. SEMI-PERMANENT BUILDINGS

Under this category, we consider the two kidding sheds with corrugated iron roofs. These are inadequate to cope with an increased goat herd and we recommend 2 extra ones. These are necessitated by the weather conditions which include rainstorms and cold nights. These should be built with poles from the ranch, be grass thatched thereby leaving the major costs of cementing, nails and labor. It is estimated that the two extra sheds can be built for about Ksh.50,000.

3.3. FENCING

Only a small very very small area of the ranch, around the office area, where beehives are kept, is permanently fenced. We were informed that fencing on the GASP ranch is controversial because the boundaries, as discussed in chapter one, are yet to be fixed officially, the costs, and the conflict with encroaching smallholders and illegal graziers.

It is important to note that the primary resource in ranching, particularly in ASAL areas, is the protection of browse and grass. In zones of conflict between settling smallholders and illegal graziers, there must be proper fencing for the viability of the ranch operation is totally dependent on utilizing the browse and grass. So for us the issue is not whether there should be fencing but how to do it cost effectively. We recommend the following:

1. The northern boundary with Mwakini, the northeastern boundary with encroaching smallholders southern boundary with Mikuyuni MUST be fenced using barbed wire immediately and live hedges planted to reinforce the barbed wire in the long-term.
It is estimated that this will cost about Ksh. 120,000.

2. The western boundary with UKAI be left free of barbed wire fencing and a live hedge planted for there is little invasion form that side. This can be undertaken during the slack period by

existing labor and thus will not be an extra cost.

3. Areas intended to be developed for fodder crops be fenced with brush immediately and live hedge planted for the long-term. This again can be done with existing labor and does not lead to extra costs.

4. At least two reserve paddocks should be created to facilitate feeding of livestock about to kid when droughts are imminent. This should be done with brush and live fence and the labor cost should be absorbed by routine operations.

5. To reduce costs, the fencing posts be obtained from the ranch through selective cutting of A. mellifera and using Premna oligotrichia and Terminalia spp droppers.

3.4. ANIMAL HANDLING FACILITIES

There is a functional small stock dip which is quite adequate, but there is not a cattle dip. There is a non-functional cattle dip just outside the GASP ranch. GASP can make the necessary arrangements to acquire this dip and rehabilitate it fully as it will be handy in the beef production program. This will save the project significant amount of money for rehabilitaing a this dip would cost about Ksh. 40,000.

A cattle crush should be constructed as it is desperately needed. If ranch generated poles are used, it should cost about Ksh. 10,000.

3.5. FACILITIES AND EQUIPMENT

3.5.1. Water Pumps

The farm has two petrol powered (5 hp and 3 hp) portable pumps and a 8 hp diesel static pump. The diesel and one of the petrol driven pumps are under repair.

The diesel engine is used to pump water to the four tanks and at the time of our visit, there was a shortage of water in some areas because it was under repair.

Pumping using diesel or petrol power is expensive in the long run. A windmill based pumping system should be installed to utilize the strong winds in the area can be installed. It should cost about Ksh. 100,000.

3.5.2. Piping

The farm uses one and a half and two-inch PVC pipes. For the small pressures required at the farm, these may be adequate. If irrigation for fodder is to be done a furrow system should be used.

3.5.3. Miscellaneous Equipment

There are two automatic veterinary syringes 30cc and 50cc. The ranch should have two more heavy duty syringes.

The one drenching gun GASP has is inadequate and two more should be added.

There is only one clipping hooves trimmer and we recommend that two more should be bought so that each boma can have one.

The ear-tattooing equipment is adequate.

There is only a burdizzo for small stock only. A burdizzo for cattle should be purchased while expanding the cattle breeding herd. These small items should not cost more than Ksh. 5,000.

Other equipment is adequate and in good state of repair. Thus we do not advise an increase in their number.

3.5.4. Farm Transport

GASP has 2 175cc Yamaha motor cycles in good serviceable condition.

Currently the Diocese assists with a lorry. The farm used to have a pick-up which has been taken for service and sale. It is important to have a pick-up on the farm as it can be used also for transporting sick workers to Kitui Hospital, marketing of livestock and other farm activities. A new pick up should cost about Ksh.400,000.

Besides the pick-up, GASP should acquire an ox-cart which can be used to transport portable houses for herdsmen as well as portable water troughs. It should cost about Ksh. 8,000.

3.5.5. Watering Facilities

The main source of water is Mikuyuni River and its tributaries.

Currently, there are two dams, a big one and a smaller one separated by a wall. Both dams are highly silted and the smaller one would be uneconomical to desilt. The large dam was made during pre-independence days and it fills when there are storms.

The area is generally dry and so control of evaporation is important. Recognizing this, GASP has developed a comprehensive water storage system. It has established a main water line from a small tank near the well in Mikuyuni River to a far tank towards Mwakini Hill. There are 7 tanks of varying capacity 2,000-20,000 gallons making a total of 75,000 gallons storage. There is a shorter line called the UKAI line with only 2 tanks of total capacity of 26,000 gallons. This supplies the offices, houses and

a lambing/kidding shed.

The water storage policy meets our approval and we recommend the building of 5 extra, 12,000 gallons tanks. 3 of these should be on the extended Mwakini line, 1 in the proposed quarantine area and the last to be put near the fodder growing area. The five extra storage tanks should cost about Ksh. 125,000.

Well development should take priority over dam construction as the two wells developed show. However, in order to reduce pumping costs (pumping mainly from the Eastern end only), 2 small dams should be constructed in the area towards Mwakini. Water can either be pumped from them or animals, especially cattle, can drink directly. These dams can be used to distribute grazing pressure and can be used during the periods just after rains. This will reduce the evaporation loss as well as utilizing the land nearest to Mwakini (a problematic ranch) early and thereby reducing their need for illegal grazing. We assume that the Ministry of Agriculture equipment can be used to construct these small dams and budget only Ksh. 30,000 for fuel.

4. RANGE IMPROVEMENT PRACTICES

There are only two techniques practiced are bush clearing and grazing pressure distribution through water distribution.

4.1. Bush Clearing

Bush clearing has been done for about one-fifth of the ranch and the results are obvious. A lot of grass has resulted which small stock as well as cattle are benefiting from. This bush clearing should be done especially in the thicket sections. The area should be scouted first and the trees or shrubs which can provide fencing and building material be utilized for such. The bush should be cleared in such a way that enough trees for shade are left and should not cause desertification. Trees which do not provide building or fencing material and which must be felled to give way to grass can be cut for sale as firewood as there is a great demand at Kitui town.

Generally burning should be done as a last resort and even then strategically just before rains (before the most reliable rainfall season) in order to avoid turning the area to a desert. However, in the very thickest areas, burning should be done so as to reduce labor costs.
Water distribution has been discussed as under watering facilities. Fencing has also been discussed. The farm has a lot of manure which should be spread in some areas to promote grasses like star grass which requires fertile soils for growth. Alternatively, the manure should be used in the growing of fodder crops.

4.2. Grazing Pressure Distribution

Good ranching demands that the management be cognizant of the need to distribute grazing pressure so as to take advantage of the fodder and to prevent degradation of land. On the whole this has been practiced. However the ranch has underutilized areas because of bush cover. Judicious bush clearing and a mixed herd will lead to more utilization of the range.

These activities are part and parcel of normal ranch operations and should not attract extra budget.

5. LIVESTOCK AND ITS MANAGEMENT

5.1. Existing Stock

At the time of our visit, GASP had the following animals:

Category	Number
Breeding ewes	156
Hoggets	52
Rams for farmers	6
Weaner rams	46
Weaner lambs	11
Stud rams	3
Cull sheep	55
Galla does	41
Breeding boers	332
Weaner billies	102
Females	183
Kids	180
Billies for farmers	98
Stud billies	17
Category	Number
Commercial does	38
Total	1320
Steers	126

As seen from the table, GASP has both small stock and cattle. The original policy was to establish improved small stock herds and flocks at GASP and to sell males as improved animals to smallholder farmers in Kitui District.

5.2. Goats.

Boer and Galla studs were established as well as a Dorper flock. These studs were formed through the upgrading of local sheep and goats and are at a stage where the Boers and Dorpers are almost pure-bred. These are, therefore, valuable sources of breeding small stock. They are also quite adapted to the climatic conditions of West Kitui and we therefore approve of the choice of the breeds.

It is, however, important to continue using pure-bred billies and rams to raise and maintain a high breeding standard. It is also important to continue rigorous selection of the parents of the next generation in order to maintain the already high standards set. High bred male stock should be obtained from Government farms especially Ol-Magogo, National Animal Husbandry Research Center, NAHRC, Naivasha or private breeders like Peter Leonard in Machakos.

GASP has been breeding a few Toggenburg crosses for possible adoption by the smallholder farmers in the higher potential parts of Central Kitui. This activity proceeded from one of the GASP objectives:

"Investigating the potential of dairy goats in the area and if suitable to encourage their adoption as a contribution to improved nutrition".

Noble as the objective may be, the Toggenburg pure-breds and half breeds are having a very rough time at GASP and they look awful. Toggenburgs are known as the most fussy of the exotic dairy goats and without going into great details, we recommend terminating their breeding. The current stock should be sold at commercial rates to farmers who want them.

If this recommendation is adopted, it will have the added advantage of simplifying the goat breeding program as fewer breeds will be maintained at GASP.

The number of Gallas kept by GASP are quite small. This is said to be mainly due to heavy culling by the immediate past manager.

Whatever the reasons which were proffered, we advise a resumption of serious Galla breeding. We recommend that females and males be bought from various sources including Isiolo, Marimanti, Naivasha, for confirmation and NAHRC, and the selection be done of weight for age, which also gives the milk yield potential of the dams as well as growth rates of the offspring. The Galla herd should be increased to about 500 breeding does.

Boers should be increased to about 500 breeding does which should be quite easy, since there are already 300 breeding does. The build-up should take a maximum of 3 years (allowing for stringent culling procedures).

5.3. Dorper Sheep

Sheep in GASP comprise 25% of all small stock. They have therefore not been taken as important as goats.

The farmers who train at GASP also have shown less preference for sheep as they have bought 70 rams only up to the June 1987 which is one-fifth of the 350 billies sold. This may be related to Kamba customs which allows farmers to milk goats but not sheep

and which also attribute some ritual contamination to sheep. Consequently there is little preference for breeding sheep in the community.

Given these facts, the utility of including sheep in the GASP program is debatable as farmers have not shown and in our opinion are not likely to show a lot of enthusiasm for sheep, however improved.

The market for Dorper males for meat appears lucrative as the sales records show that in 1987, 60 were sold for meat perhaps to be taken outside the Kamba community. Considering the small size of the flock, this was a high percentage. In 1988, already there are 55 cull sheep which can be disposed of. It does appear that sheep are kept mainly for these sales and in this case their increase in numbers will result in higher sales to butchers, but may be not to farmers.

In view of the above discussion, we recommend the raising of the breeding flock to about 200 ewes and to intensify extension exercises to make farmers aware of the potential returns from improved sheep. This in turn should be monitored to indicate if keeping high grade dorpers at GASP is cost effective.

5.4. Shoats Breeding Stock Increase

All in all, we are recommending an increase of the small stock herd to a total stocking of 3000.

40% of the total stock should be breeding females i.e. 500 boers, 500 galla and 200 dorpers. This will utilize the abundant browse during the rains and the grass during the dry season.

This strategy would mean buying of 500 female gallas, 10 dorper males, 10 galla males and 10 boer males at a total cost of Ksh. 336,000 during the first year.

5.5. Steers and Breeding Stock

GASP has 126 steers which were bought in 1987. There are controversies on the price paid, their diseased condition on being bought, which contaminated the ranch and thus has to date limited marketing of other livestock from the ranch. Clearly these management mistakes have cost the ranch a lot. However this does not mean that the idea was bad. The problem appeared to be connected to their bringing foot and mouth disease to the farm, the latter of which made the DVO impose a quarantine which up to December 1988 had not been lifted.

The purpose of buying steers was to utilize the grass in GASP and to provide revenue through sales. The idea meets our approval and we STRONGLY RECOMMEND THAT THE RANCH CONTINUE THE ACTIVITY SO AS TO IMPROVE ITS VIABILITY. The financing of up to 200 steers should come out of sale of current herd and thus we do not foresee extra investment.

5.5.1. If our recommendation on a flying herd is preferred, it will also involve the creation of a small quarantine section in order to avoid contaminating the whole ranch when the animals are bought from dubious sources.

5.5.2. Maximum profitability of this activity will depend on strict adherence to veterinary precautions, bush clearing to increase the amount of grass available and or possible fodder crop establishment to assist in finishing.

5.5.3. Keeping a flying herd has the advantages that the farm can recover after the fat stock has been sold and the new lot can be brought in when grass is plenty.

5.5.4. A flying herd of 200 would generate roughly three times the revenue of a breeding herd as shown in Appendices 7 and 8. Disease problems aside, if the buying in is done when the prices are lowest and if the animals are mature and they are just thin, then feed permitting, the animals can be fattened within a year and the profit of Ksh. 2,500 per head is possible. The provisos are important and it is imperative that the animals bought are not too young or else they will take long to fatten. Even more important is ensuring that the animals are disease free.

5.5.5. The previous manager recommended that the ranch develop a breeding herd. This seems to have significant backers within the Diocese. We do not approve of it for management, technical production and economic reasons.

5.5.6. On management, experience elsewhere shows that accounting for calves can be problematic.

5.5.7. From a ranch utilization point of view a breeding herd is more vulnerable to lack of feed driven by weather conditions. Fantastic loss can be incurred in bad years for a breeding herd stretches the carrying capacity at all times whether there is forage or not.

5.5.8. The returns from such a herd are only a third of the returns from keeping a flying herd.

5.5.9. If the Diocese still prefers a breeding herd for non-economic reasons there are ranches in the proximate area where clean animals can be procured. A clean herd of 100 B2 Yatta pregnant heifers be bought once the quarantine is lifted.

5.5.10. Given the ranch capacity, this herd should be built to reach a maximum of 150 breeding females from which animals will be bred for sale at 2 years if the calves are not milked when produced.

5.5.11. Growing own fat stock involves keeping suckler cows. If the cows are not milked, male calves can reach 200kg in the first year. However, such animals are young and devoid of fat. In order

to reach a suitable weight of 350-400kg, the males have to be grown for an extra 2 years. But by the time they are sold, the dams should be weaning another calf crop. If there are no droughts the ranch can sell 31-43 fat bulls each by the fifth year during the first nine years as shown in Appendix 7.

5.6. General Condition of the Animals and Kidding Policy

We visited the farm at a difficult time with respect to browse availability and consequently the small stock especially the lactating does were in bad condition. This status of affairs arose out of kidding before the rains started hence lack of browse during lactation. This poor shoat condition is also exhibited by the young stock and will be reflected in low weaning weights. The cattle were not in a bad condition. They only needed to be finished.

We are aware that an earlier recommendation stated that GASP should aim at 3 kidding in 2 years. The conditions we describe above seem to have resulted from attempts to meet this earlier recommendation.

Rainfall in this farm is very erratic and it rains in only a few days. This results in the does having a rough time catering for themselves and the kids. Accordingly, we recommend strongly that GASP sticks to one kidding per goat per year. This kidding should be done in November so that the dams and the kids can benefit from browse in the short rains, wean the kids in March and have the dams ready to build their condition in the long rains while the weaners pick weight when browsing the long rains browse.

The once a year kidding has the advantage of producing a fairly uniform crop, but involves more labor during kidding and may require extra kidding sheds but the advantages outweigh the disadvantages.

5.7. Supplementary Fodder

In order to stave off possible drought effects during shoat and cattle lactation, we emphasize the establishment of a fodder area immediately for the costs are negligible. This fodder crop can be napier grass. Reports indicate that such a crop should have been established already, but it is not clear whose responsibility it was.

5.8. Livestock Management Standards

Except for this difficult period, GASP has been kept at a high standard. Kidding percentage has been 120% with the average birth weight (after the first suckling) of 3kg. The average weight immediately after first kidding was quite high about 30kg while mature goats averaged 45kg.

5.9. Curative and Prophylactic Management of Disease

At the time we visited the ranch, there was no out-break of any killer disease in any of the livestock types. Earlier reports, MLD GASP Evaluation 1987 refers, however, showed that there was a CCPP outbreak in 1986 which killed 40 small stock. This was mainly due to the ranch's failure to procure CCPP vaccine on time. The death losses would have been more if the manager did not result to the use of L.A. oxytetracylines. These are unnecessarily expensive.

We emphatically recommend compulsory CCPP vaccination every 6 months; proper disease diagnosis (use Vet. Labs at Kabete) and a judicial use of anti-biotics if an outbreak occurs. It is estimated that drugs would cost about Ksh. 10,000 per year.

Brucellosis is a sexually transmitted disease, causing contagious abortion and failure to conceive, which is difficult to diagnose. It is necessary to use proper techniques like complement fixation test or ELISA. These tests are best done in Kabete Vet. Labs and many samples should be sent. Even then, the disease is virtually incurable in our current state of knowledge.

It is for the above reasons that we advise a routine sampling of the small stock and if a goat is proved positive, it should be culled. Goats brought in should be tested before they are bred in GASP. Males should be screened.

The earlier sampling for brucellosis as per MLD, GASP Evaluation 1987 was inadequate. Sampling is now overdue. Kidding sheds are natural habitats of brucellosis pathogens. These should be scrubbed regularly using appropriate detergents. Brucellosis shows in very different forms and as such farm hygiene has to be up to date in order to curb this problem. Ksh. 5,000 should be sufficient to ensure sanitary conditions.

Intestinal worms of various genera occur in small stock all over Kenya, including GASP. Their effects are mainly weight reduction, death in the absence of other infections occurring quite occasionally. Their control can be expensive and for this reason we recommend:

a. Fecal sampling to establish the most common worms.

b. Judicial choice of broad spectrum antihelmintics avoiding the most expensive e.g. Panacur.

c. Judicial deworming. This should occur just at the onset of the rains to avoid the effects of hypobiosis and to reduce loads on young stock.

The costs for a,b,and c should be budgeted at around Ksh. 6,000.

d. External parasites occurring at GASP are mainly ticks and lice. These can be a great problem although they do not cause mortality. They can be controlled through judicious dipping. It is, however, necessary to maintain dips at the right strength

through using services of Pharmaceutical companies e.g. Wellcome and to use appropriate acaricides, which are not too toxic, e.g. we advise a discontinuation of coopertox. Dip chemicals should not exceed Ksh. 4,000 for all livestock.

e. Most of the other diseases or conditions can be controlled through vaccinations mainly e.g. rinderpest - two vaccinations in yearlings, foot and mouth - once when there is outbreak in neighboring farms, blackquarter and anthrax - once a year, enterotoxemia - once a year. The cost of these are not normally prohibitive and we estimate they will only be transporting government officials to site. We therefore allocate only Ksh. 1,000.

5.10. Wildlife Problems

GASP is unfortunate to have several cheetahs inhabiting their farm. These cheetahs have killed many small stock to-date 32. Wolves also cause occasional losses, to-date 15. The Ministry of Tourism and Wildlife sent a gunman who was unable to trace the cheetahs. It is imperative for the Ministry to send another guard and GASP to pay night-outs as is the custom as we know compensation for losses due to wildlife are difficult to come by.

Cheetahs fear vicious thorns and as such all the kidding sheds should be surrounded by thick thorny fences to keep them off the kids.

Baboons are more crafty and to keep them in control, guards should be posted at the sheds all day as they tend to disturb and scare kids a lot. Baboons also mess water facilities, but currently all the water tanks are built with covers.

6. WORK FORCE AND MANAGEMENT ISSUES

The following category of workers are at GASP:

Category	Number
Manager	1
Training Officer	1
Record Clerk	1
Herdsmen	16
Laborers	8
Cooks	2
Driver/mechanic	1
Total	30

The current Project Manager is an ex-teacher and also an ex-animator. He has a general knowledge of livestock having worked under the immediate past ranch manager.

It is our view that a new Ranch Manager who is experienced in livestock husbandry, disease prevention treatment should be

employed as soon as possible to work under the Project Manager.

The Training Officer is a trained Range Management Assistant. He has done a good job, but to continue, another T.A. (a A.H.A. ex Ahiti) should be deployed to help in teaching as well as disease prevention and cure at the farm.

The Record Clerk, according to the former Manager, is a most experienced herdsman. With the exception of the Driver/mechanic, the other staff have had not formal training.

The expansion of the herds will require extra staff especially herdsmen whose ideal staffing and distribution should be 24 small stock herdsmen and 3 for cattle herdsmen. This number should be build up as the herd increases. The number allows for the regulation days off.

The number of watchmen is too small and we suggest one per boma including the kidding sheds when there are kids for a total of five bomas. These should not be regarded as special guards, but rather be integrated with the other labor, as the herding work is the most taxing and requires sufficient days offs.

The Managers will be expected to drive themselves, therefore, we do not envisage an increase in number of drivers who from experience tend to regard themselves as specialized personnel.

These recommendations call for an extra staff increase of 16 general staff over a three year period. This will cost Ksh. 32,000 in the first year, Ksh. 64,000 in the second and Ksh. 96,000 in the third year.

7. MARKETING OF LIVESTOCK

As per objectives of GASP, any small stock deemed of good quality should be used in either GASP herd build-up or be sold to GASP trained farmers. The other stock is supposed to be sold for meat.

The sale to farmers is restricted by the policy requiring that one must have been to the center for training. Up to the end of June 1987, only 347 billies and 69 rams were sold to farmers. To increase the number sold through this avenue, it is necessary to carry out more training and to convince other farmers in Kitui District of the need to improve their small stock.

Small stock culls are generally sold for meat. There is generally no real problem in selling goats for meat as Kitui is quite near Nairobi. However, quarantines especially Foot and Mouth ones do cause a lot of delays.

Culls also should be divided into 2 groups and the better ones should be offered to interested farmers or ranches at a slightly higher price than the meat value. Controversial as it may be, we feel this sale will improve the Kitui small stock to some extent.

The price fixed for trained farmers is Ksh. 450 per billy. This is low by Kenyan standards and we feel the real value is about Ksh. 1,000.

To move more animals out of the project, we have recommended increase in number of farmers trained. We also recommend increase in the price to trained farmers to around Ksh. 800.

A way of recovering the difference of Ksh. 200 should be found e.g. get a development project (e.g. the Kitui ASAL under formulation by DANIDA) to underwrite the difference. The Kitui small scale farmer needs to be made aware of the benefits of using improved breeds of small stock. The project should take advantage of linkages with other diocesan development activities to increase the impact of the message and to reduce the project extension cost.

We however should point out that the limiting sale of improved billies only to trained farmers does not in the long-term improve the genetic composition of the Kitui herd in general. Selling improved billies to any body in Kitui who wants them will have impact in the community in the long-term. It should be encouraged and the sales should be on the commercial price. If this is done, the normal breeding selection practiced by wananchi would lead to general breeding improvement.

The marketing of cattle for meat is also quite simple. However, to get good prices, the animals should be well finished and our recommendations on bush clearing and fodder production should make a contribution towards this end. Disease prevention should be done properly or else quarantines can make the whole operation uneconomical.

9. SOURCES OF ADDITIONAL ANIMALS

We have proposed an increase of the small stock herds and flocks to a maximum of 3,000. Good boers are difficult to come by and even then only a few. We suggest that GASP buys in only the bucks. These are obtainable from a few farms including NAHRC.

Gallas are varied in performance. We suggest various sources e.g. Isiolo, Marimanti, Kiboko, NAHRC. However, it is important to have the new animals quarantine at GASP and to test them for Brucellosis before being mixed with the current herd.

Dorpers should be obtained from recognized breeders.

It is our recommendation, due to disease problems, that GASP buys in disease free female cattle from Yatta B2 and produces young stock for sale. The number required (100) is small and can be obtained easily. The former manager says that he had already located farms which could supply these and this information is with the current management.

10. SMALLHOLDER TRAINING ASPECTS

10.1. RESIDENTIAL VERSUS NON-RESIDENTIAL TRAINING

Residential training is regarded as a major activity of GASP. The number who have attended the residential course are shown in Appendix 8.

The residential course is a 5-day course which covers general husbandry practices, pasture management and disease control. The fourth day is devoted to demonstrations of the activities at GASP, as well as the small stock breed types.

This course is quite short and at best it can only cause awareness. To make it useful, a proper follow-up and retraining program is needed. To do this, a liaison with the government extension service is needed and if possible GASP can assist with transport which government officers tend to lack. However, this has to be well planned and coordinated, to minimize transport costs. The Diocese has to develop a strategy for our conversations could not lead to resolution of the issue.

The course is handled by a single Technical Assistant who has studied Range Management at AHITI, Kabete. This is quite tiring and we suggest that a AHA should join him, to handle the disease prevention aspects and to stand in for the Ranch Manager when he is away.

There has been a complaint that the number trained is small. We were informed that 1456 were trained, yet the lists made available to us reflect only 1279 over the past 10 years. As shown in Appendix 8, the training has concentrated in the Central Division where the farm is located. A case can be made easily that the most deserving areas for future training are in Northern, especially Kyuso Division and Eastern.

We would have liked to analyze the data to establish what percentage of trainees were women. The records are such that no definitive statement can be made about the numbers of women. However it is our impression that women trainees have been the minority.

The capacity of the dormitories is 16 and this allows 32 farmers to be trained per month. Excluding the three months when the farmers are busy on their farms, the number expected is 288 per year. It is clear on purely numerical grounds, fewer farmers have been trained since the existing capacity could have led to 2,880 trainees if fully utilized.

Various reasons have been given to mitigate the low number. The main one being the fact that farmers are poor and thus they cannot afford the transport costs to the center for residential training.

According to GASP, participating farmers are refunded only half of the fare to Kitui town, irrespective of the distance. In a dry and large district like Kitui, some farmers may be justified in claiming that the fare is too high for them.

Besides, not all farmers accept that they need to be taught how to look after goats. Others are too busy to get time to attend the courses except during school holidays.

In our opinion the residential training should be for candidates selected by groups or opinion leaders who would return to their communities to spread the gospel so to speak rather than individual farmers who are to invest in a billy as well as the training costs. This approach is quite different from what exists now and we urge the Diocese to consider it seriously. If it is adopted trainee transport costs and the purchase cost of a billy can be a group affair thereby simplifying financing for the poor groups. This also would extend the genetic impact of the billy for it would have to service more goats. Groups can then exchange them and widen the breeding circle.

The current training procedure of teaching at GASP needs to be supplemented by group teaching near the areas where farmers come from and then organizing a tour to GASP to see the activities. Group animators can be used to advantage to make farmers aware of such courses, determine suitable times and places and then use the government administration to advertise the courses in Barazas, women group gatherings, markets and even in the churches of all denominations. Such outside courses will cost much less than the current ones.

The venue of the courses should not affect sales negatively. If anything the field days can increase the demand even more.

Publicizing GASP courses should be done vigorously. We were told that many sub-chiefs and chiefs are not even aware of the activities of GASP. We suggest a residential course for these administrators be done soon as possible. It is hoped that after they are convinced, it will be easier to use them as recruiting agents. Nominees of women groups can be trained similarly and in this way the courses will have a greater impact for they would in turn train their group members.

11.2. THE BENEFIT OF GASP TRAINING

The sale of superior bucks is linked to training and as such a farmer gets a buck at a subsidized price of Shs. 450 instead of about Shs. 1000. This is only part of the benefit as the farmer learns the skills to raise the other goats profitably. This to most farmers is the greater profit. To know when to de-worm, how to de-worm, using simple equipment like syringes and how to tell the most important diseases, is more valuable than to use

improved billies. Such courses should also reach some of the rich goat owners who will contribute to the wealth creation of Kitui District unlike current policy which deliberately seeks to keep them out.

The improved goat breeds distributed by GASP are mainly Boers and Gallas. Boers are dual purpose, the kids grow fast, they have more milk and the goats are big, fetching more money at sales. It is important to realize that the farmer produces cross-breeds and hence these animals do not produce like the pure-breds. However, the improvement achieved will produce goats yielding about 200cc of milk for the farmer besides the amount suckled by kid. This may sound little, but in some poor families it is not so little. The male goats produced will show an advantage of about Shs. 200 if sold at about 2 years old. These minimal gains per animals should be borne in mind as it will take some time before GASP can sell improved females to trained farmers. This improvement is additive such that the farmers with more goats will be reaping more.

The improved billies are likely to be under-utilized in some cases. Groups and farmers should be encouraged to share billies as in this way GASP efforts will have higher multiplier effects. There is no reason why neighboring farmers cannot share the purchase price. The same can be extended to women groups or even mwethya ones. All avenues of distributing the superior genes should be utilized. Joint ownership of animals is well institutionalized in Kambaland and should be used by GASP to the best advantage.

Appendix 1 Recommended Investment Non-Livestock (Ksh.)

Item	Amount	Year
1. Pickup	400,000	1&6
2. Water Tanks	125,000	1,2&3
3. Fencing	120,000	1,2&3
4. Wind mills based pumping system	100,000	1,2&3
5. Extra Work force	96,000	1,2&3
6. Kidding Sheds	50,000	1,2&3
7. Dip Rehabilitation	40,000	1
8. Small Dam Construction	30,000	2
9. Oxcart	8,000	1
10. Veterinary Drugs	7,000	annual
11. Equipment	5,000	1&6
12. Dip Chemicals	4,000	annual

Appendix 2: Current and Target Sheep and Goat Breeding Herd

Our recommendation is to build up the sheep and goat herd to reach a total of 1,200 breeding females. Current and target female numbers and the extra females and males to be bought are shown shown below .

Category	Current Females	Target Females	Purchase Females	Purchase Males	Cost Ksh.
Dorper	150	200	-	10	15,000
Gallas	40	500	500	10	306,000
Boers	330	500	-	10	15,000
Total	520	1,200	500	30	336,000

Appendix 3: Goat Herd Build Up

The following assumptions are used in the calculations of both the goat and sheep herd build up.

1. Kidding rate per year	90%
2. Kid survival rate year 1	90%
3. Yearling survival	90%
4. Death rate of matures	5%
5. Kids sex ratio	50:50
6. Mating age	2 years
7. Goat Units	
< 1 year	0.3
1-2 year	0.5
2-3 year	0.8
> 3 year	1
8. Culling policy	
After year 4	50%
year 5	50%
year 6	100%

Year	Breeding Females	< 1 Yr.	1-2 Yr.	2-3Yr.	Total Goat	Total Goat Units
1	1000	900	-	-	1900	1270
2	950	856	810	-	2616	1612
3	902	810	770	730	3212	2114
4	1185	1066	730	692	3673	2423
5	1035	932	960	656	3583	2319
6	1055	950	838	864	3707	2450
7	1253	1128	854	754	3989	2622
8	1275	1148	1014	770	4207	2742
9	1355	1220	1032	914	4521	2968
10	1475	1328	1098	930	4831	3166

Appendix 4: Sheep Flock Build Up

Year	Breeding	< 1 Yr.	1-2 yr.	2-3 Yr	Total Sheep	Total Sheep Units
1	200	180	-	-	380	254
2	180	162	162	-	504	310
3	162	146	146	146	600	396
4	212	190	132	132	666	441
5	191	172	172	118	825	423
6	196	176	154	154	680	449
7	214	192	158	140	704	463
8	236	212	174	142	764	500
9	251	226	192	156	825	540
10	260	234	204	172	870	570

Appendix 5: Projected Shoat Sale Gross Income

Year	Male Goats	Female Goats	Goat Income	Male Sheep	Female Sheep	Sheep Income	Total Income
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	328	420	454000	66	73	67400	521400
5	311	215	376000	59	37	54600	430600
6	295	-	295000	53	-	42400	337400
7	388	120	424000	70	24	60800	484800
8	340	60	358000	63	12	52800	410500
9	346	144	389000	64	34	58000	447000
10	411	163	460000	70	30	62000	522000

The selling assumptions are;
Billies Ksh. 1,000
Rams Ksh. 800
Doe Culls Ksh. 300
Ewe Culls Ksh. 200

Appendix 6: Cattle Breeding Herd Build Up

Year	Breeding Females	Calves Born	1 Year	2 Year	3 Year	4 Year
1	100	45	-	-	-	-
2	95	43	43	-	-	-
3	90	41	40	40	-	-
4	86	39	38	39	39	-
5	118	53	37	37	37	37
6	153	69	50	35	35	35
7	186	84	65	48	33	33
8	214	96	80	62	46	31
9	257	116	92	76	59	43

Appendix 7: Cattle Breeding Herd Returns

Year	Income
1	-
2	-
3	-
4	-
5	185,000
6	175,000
7	165,000
8	155,000
9	215,000
Total	895,000

The assumptions are that each animal sold will fetch Ksh. 5,000.

Appendix 8: Flying Herd Returns

Year	No. Bought	Cost	No. Sold	Gross Income	Gross Return
1	200	500,000	-	-	-
2	-	-	190	950,000	450,000
3	200	550,000	-	-	-
4	-	-	190	1,140,000	590,000
5	200	605,000	-	-	-
6	-	-	190	1,368,000	763,000
7	200	665,500	-	-	-
8	-	-	190	1,641,600	976,100
9	200	732,050	-	-	-
10	-	-	190	1,969,920	1,237,870
Total	1,000	3,052,550	950	7,069,520	4,016,970

The assumptions are:
Buying price Ksh. 2,500: Annual price increase 5%.
Sale price Ksh. 5,000: Annual price increase 10%.

Appendix 9: Total Livestock Gross Return

Year	Shoats Purchase	Shoat Sales	Cattle Purchase	Cattle Sales	Gross Return
1	336000	-	500000	-	(836000)
2	-	-	-	950000	950000
3	-	-	550000	-	(550000)
4	-	521400	-	1140000	1661400
5	-	430600	605000	-	(174400)
6	-	337400	-	1368000	1705400
7	-	484800	665500	-	(180700)
8	-	410500	-	1641600	2052100
9	-	447000	732050	-	(285050)
10	-	522000	-	1969920	2491920
Total	336000	3153700	3052550	7069520	6834670

Appendix 10 Recommended Investment and Gross Return Schedule

Year	Recommended Non-Livest. Investment	Gross Return	Shortfall
1	634000	(836000)	(1470000)
2	228000	950000	722000
3	215000	(550000)	(765000)
4	17000	1661400	1644400
5	19000	(174400)	(193400)
6	468000	1705400	1237400
7	23000	(180700)	(203700)
8	25000	2052100	2027100
9	27000	(285050)	(312050)
10	29000	2491920	2462920
Total	1685000	6834670	5149670

Appendix 11. Trainees by Location and Division

Number	Location	Division
180	B2	Central
143	Yatta	Central
101	Matinyani	Central
80	Changwithya	Central
59	Miambani	Central
22	Zambani	Central
13	Mulango	Central
1	Kisasi	Central
Subtotal	599	
137	Mwingi	Northern
39	Mivukoni	Northern
31	Katse	Northern
19	Kyuso	Northern
11	Tharaka	Northern
7	Tseikuru	Northern
4	Ngomeni	Northern
1	Ukasi	Northern
Subtotal	249	
65	Mutomo	Southern
62	Ikanga	Southern
50	Kanziku	Southern
29	Ikutha	Southern
19	Athi	Southern
7	Voo	Southern
4	Mutha	Southern
Subtotal	236	
100	Mutonguni	Western
31	Migwani	Western
Subtotal	131	
21	Mutito	Eastern
16	Nuu	Eastern
1	Mui	Eastern
1	Zombe	Eastern
1	Endui	Eastern ?
Subtotal	40	
24	Other Districts	
Grand Total	1,279	