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Erledigt:.....

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PROPOSED AGRICULTURAL STRATEGY
FOR ZAMBIA'S DRIEST DISTRICT

by

RONALD WATTS

Report and recommendations
following a two-months visit
to the Gwembe Valley
Agricultural Mission commis-
sioned by HARVEST HELP, London.

ACKNOWLEDGEMENTS:

As with all such reports based on a relatively fleeting visit the contents are not primarily the work of the writer. They are based on the information supplied by countless people in both Zambia and Zimbabwe. Much useful information was gained from people that I gave lifts to in the valley but also from the farmers seminar held at Siavonga. My role was to sift through the information and come up with an overall strategy for assisting the people particularly in the lakeshore area.

Not all the suggestions in this report are implementable by the Gwembe Valley Agricultural Mission. It is hoped that other agencies will take up some of these initiatives by themselves or in cooperation with GVAM.

One of the main features of my visit was to identify all the agencies operating in the Gwembe Valley. By distributing this report widely it is hoped that cooperation and coordination will be improved. The following is a list of some of the key people/agencies that are being sent this report:

- a) District Agricultural Officer, PO Box 15, Gwembe Boma, Via Chisekesi, S. Prov.
- b) Planning Adviser, GTZ Team, PO Box 97, Siavonga, S. Prov.
- c) Gossner Service Team, PO Box 66, Sinazeze, Via Choma.
- d) Gossner Service Team, PO Box 50162, Ridgeway, Lusaka.
- e) Danish Volunteers, Siavonga Nutrition, Group, PO Box 53, Siavonga, S. Prov.
- f) Sebungwe Project, Dept Soil Science, Faculty of Agric. PO Box MP 167, Mount Pleasant, Harare, Zimbabwe.
- g) Elizabeth Colson, 840 Arlington Blvd. El Cereto, California 94530, USA.
- h) Dr Ted Scudder, Division of the Humanities & Social Sciences, California Institute of Technology, Pasadena, California 91125
- i) Director, RDSSB, University of Zambia, PO Box 30900, Lusaka.
- j) Officer i/c, Mount Makulu Central Research Station, Private Bag 7, Chilanga (FOA: Sorghum, Sunflower, Maize, FCSU teams)
- k) Officer i/c Soil Survey Mount Makulu, CRS, Private Bag 7, Chilanga.
- l) Coordinator, Lusume Services, PO Magoye, Via Mazabuka, S. Prov.
- m) Gwembe Valley Development Company, PO Box 10, Sinazeze, Via Choma.
- n) ARPT Coordinator, Mount Makulu CRS, Private Bag 7, Chilanga. (FOA: Lusaka & S. Prov. teams)
- o) Mr Van der Veen, Agritex, PO Box 191, Chinoyi, Zimbabwe.

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1. Introduction:

Although my brief was to concentrate on agricultural production it should be emphasised at the outset that the area covered by GVAM has an extremely low and erratic rainfall. The risk of crop failure with rainfed crops is extremely high and therefore ways have to be found of supplementing rainfall. In addition, however, non agricultural production of fish, crafts and possibly honey need to be maximised and will be touched on in this report.

Back in the 1960's Dr Mosher drew a neat distinction between what he called "the essentials" for agricultural development and "the accelerators". Essentials included markets, transport, input supplies and reasonable prices. Accelerators included agricultural extension and credit. The point that is still often overlooked is that accelerators only work where the essentials have been adequately provided. GVAM have been quite correct to emphasise the organisation of small multi-purpose cooperatives as a first step. Transport has also been rightly stressed as in much of the area this was non-existent when the project started. The time is now ripe for agricultural extension and this will be the main emphasis in this report.

2. Conditions in the Area:

a) Climate: Rainfall in most years is inadequate for reliable yields and during the 1986-1987 season totalled 411.50 mm at Munyama. This compared with 435.50 mm at the Lusitu Research Station. Both are well below the mean for the area which is thought to be around 700 mm. However, for crop growth distribution is also very critical and it should be noted that 178 mm at Munyama fell over a period of 6 days in December. Dry spells included one of 2 weeks in December, one of 10 days in January and one of 24 days in March. Under such conditions water conservation measures such as tied ridges can be critical and this will be discussed later.

b) Lake Kariba: The project currently serves all the communities along the lakeshore from Siavonga to a hilly peninsula called Kota Kota. Obviously the lake is a major resource both for fishing and water for agriculture. The water is considered excellent for irrigation but the problem is the high cost of pumping up above the high water level. This is 488 metres above sea level (compared with the current level of 477 metres). The lake has not exceeded 483 metres since October 1982. Because of the importance of lake level fluctuations if lakeshore cultivation is to be expanded this report will devote considerable attention to establishing whether they can be predicted.

c) Soils: The Valley is some 20 to 30 kms wide and lies between the lake and the escarpment. There are relatively few flat areas and most of these are in the south and extreme north below the dam. The rest of the valley floor is interrupted by many low ridges, often of sandstone. A major soil survey has just been completed by the Soil Survey Unit based at Mount Makulu, near Lusaka. This has involved 11 profile pits dug between Siavonga, Lusitu and Chirundu. Landsat and aerial photographs have been used, but the lakeshore zone has largely been ignored because so much of this zone consists of rocky outcrops or sandy beaches.

The main areas of deep Mopane soils are found in the south where irrigation schemes have been developed at Siatwinda, Buleya Mulima and most recently at Sinazongwe. An area near Kariba Store and Hamatika has been identified having a nutrient rich soil with a high level of seepage from the hills. Another area of seepage is found on the lakeshore where the Lufua River enters about 40 kms south of Siavonga. When we visited the area in mid-September there were impressive crops of hybrid maize grown without fertilizer or irrigation. Unfortunately, all these gardens would be inundated if the lake level should rise as it will as soon as rainfall returns to its normal pattern (see Appendix 1).

3. Existing Systems of Farming:

Although the area has been greatly neglected in recent years, due to the government's economic problems and the Zimbabwe war, it is not true to suggest that no development has taken place in the past. Ploughing with oxen is widely practised and in good years of rainfall substantial crop surpluses have been sold outside the district. Details of cotton production are given at Appendix II and it will be seen that this year's production was a record low due to the poor rains. Other surpluses from Gwembe North in recent years were maize (36,450 kgs) and sunflower (49,950 kgs) in 1981-1982. The other main crops which are grown for consumption by farm families or sale through local markets are: sorghum, pearl millet, cowpeas, pumpkins, cassava, sweet potatoes, groundnuts, bambara nuts, melons, finger millet, tobacco, hemp, beans, sesame and chillies (see Appendix III).

Before the flooding of Lake Kariba a high proportion of the Tonga people lived along the river banks and Scudder has described what was considered to be "a relatively advanced system of semi-permanent cultivation". This was based on the annual flood from January to May and involved growing crops in the alluvium and residual moisture from June onwards. In the early days of the lake the levels were rather unpredictable and even in 1973-1974 and 1977-1978 levels fluctuated widely due to spillage when the lake is full. The low levels of the 1980's have however, encouraged what is called draw-down cultivation using similar techniques to those adopted along the river bank prior to the dam.

4. Rainfed Cropping:

The scope for improving the existing systems is extremely limited. The Lusaka Province Adaptive Research Planning Team has studied a similar area near the Zambezi/Luangwa confluence. Substantial changes to the existing systems will take several years of testing before they can be widely used as "extension messages". The problem of how to devise improved systems is made more difficult when there is often a 50% chance of a complete crop failure.

The organisation Global 2000 is currently laying down demonstrations on sorghum growing on the edge of the GVAM area. During planning meetings there was considerable controversy over whether fertilizers should be used. They plan to use 100 kgs Cpd.D or X per Ha. plus 100 kgs urea on all plots. Since they will be using the new pre-release varieties (mmSH 178 and SDS 3136) the risk of a crop failure should be reduced. The 178 hybrid gave a yield of 1492 kgs/Ha on 145 mm rainfall after planting on 27 December at Lusitu. In the same trial the existing variety ZSV 1 gave 522 kgs. If acceptable on other grounds (such as storeability, susceptibility to birds and insects etc) these varieties should give much greater opportunities to obtain a crop in a poor rainfall year. There is also a new composite (SDS 3136) which will gradually replace ZSV 1 which has proved to be susceptible to a virus disease. If the risk of crop failure can be reduced then fertilizer could become more viable; so a watch should be kept on the Global 2000 "demonstrations".

Maize continues to be a popular crop in spite of the 90% failure of the 1986/87 planting. The composite variety MMV 400 has made a major contribution in the valley and is extremely well suited to the draw-down system because it is ready for picking green in about 60 days. Given good sites it is possible to grow 6 crops a year! It has the great attraction that seed can be saved without serious loss of yield potential. The hybrid varieties (this year MM 504 and R201 from Zimbabwe are being sold) should wherever possible be planted in places where there is supplemental moisture from seepage or draw-down.

If the more drought tolerant crops sorghum and millet are to be made more popular then something will have to be done about the bird problem. This is treated in a separate section but it is obviously a key factor in the preference for maize where of course, the grains are protected from birds by the sheath.

One technique that should be tried is TIED RIDGING. A very effective demonstration was carried out with the farmers using 2 wheelbarrows. One was filled with soil and levelled off while in the other the soil was formed into a basin shape.

Rainfed Cropping (continued)

Two sprinklers were then used to simulate heavy rainfall and after 5 minutes the water started to run off the levelled soil. The basin-shaped soil just filled up and there was no run-off. One farmer lent forward and brushed the level soil with his finger to show that 2 inches below the surface the soil was still dry.

This technique is used widely by tobacco farmers in Zimbabwe and at Lusitu in 1970 gave a combined yield for maize, sorghum and millet of 2,130 kgs/Ha, compared with 810 for the same crops grown on the flat. The technique is difficult to practise with oxen, particularly if intercultivation is practised. Farmers were advised to try it on a small-scale particularly with groundnuts.

5. The Project Area's Potential for Supplementary Irrigation:

I undertook both in Zimbabwe and Zambia to gauge current developments and the potential for irrigation under similar conditions to those in the Mission area. Much is happening in this area with a very large scheme already operating in Gwembe South. This is the Gwembe Valley Development Company which is irrigating nearly 2,000 ha. with centre pivot machines covering 83 ha. in one sweep. The crops are wheat in the winter and cotton in the summer (100% forex retention on cotton). I visited the scheme and also the small-scale Siatwinda scheme nearby. I also visited the Charara large-scale banana-pineapple scheme in Zimbabwe and the Lusitu banana scheme in Zambia. I discussed irrigation prospects with several EEC and Agritex officials in Harare. The unanimous opinion was that small-scale irrigation schemes are extremely difficult to operate above high-water mark on the lakeshore because of the fluctuating lake levels. Irrigation schemes of this sort are uneconomic if there is no mains electricity. I therefore propose extreme caution in proposing any conventional scheme. Various large-scale schemes are currently under consideration in Gwembe South and North.

My main conclusion on the question of potential for irrigation is that the lakeshore area in North Gwembe has much less potential than South Gwembe where there are large areas of flat Mopane soils which are deep and relatively fertile. The new GTZ (Federal German Aid) team which has moved into Siavonga in recent months is specifically looking at irrigation and has identified the area between the Zambezi and the Lusitu-Kariba Store road as having a high potential. A soil survey of the area has just been completed and the team spent a day with us in that area and as far as the lake at Gwena. A copy of the map that has been produced should arrive at GVAM shortly. The GTZ team have access to satellite imagery of the lakeshore area and should be able to identify areas that have potential.

In summary I advise caution in going ahead with irrigation plans other than the following:-

- a) Maximum use of the draw-down area along the lakeshore which can be relied upon in 9 years out of 10 during the period June to December when the lake falls by about 1/2 metre per month.
- b) Experimental use of hand operated and small petrol or diesel pumps in the demonstration area at Munyama plus at least one site per coop. Capital cost to be met by the Mission until they are proved to be viable.
- c) Experimental use of a windmill possibly mounted on floats.
- d) Experimental damming of inlets to create basins for use in fish culture/paddy rice/vegetables.

6. Lakeshore Cultivation:

This is not a new proposal since as already indicated, it is widely practised. There appears to have been no restriction on this type of cultivation in spite of the fact that it is technically illegal in Zimbabwe. There is a law which prohibits cultivation of land within 30 metres of a water course or dam. This apparently includes cultivation of the draw-down area. While nowadays this law is not so strictly enforced there is still some resistance to the idea because of the risks of encouraging soil erosion and silting of the lake. To combat these objections, it would be good if observations could be made during the rains to see whether there is any increased erosion. In general it is always a good idea to leave a margin uncultivated around a plot so that any soil wash is minimised.

It is extremely unlikely that such a law would ever be enforced in Zambia because of the extensive cultivation of river banks and islands on the Zambezi, Luangwa, Kafue and other rivers. As with Lake Kariba, such cultivation provides an important means of supplementing rainfed cropping with a wide range of fresh vegetables which contribute greatly to the diets of the people in the area. In the Siatwinda area of Gwembe South a substantial cash crop has been developed in okra which is grown on the lakeshore. Some of this is irrigated with pumps, but depending on the soils, slope and presence of impermeable layers, excellent yields can be obtained without pumping. Some farmers are ploughing substantial areas of 2 Ha. or more along the lakeshore during the draw-down period from June to December.

Lakeshore cultivation has two potential periods. From meetings with CAPCO staff in Harare (now in theory replaced by the Zambezi River Authority) it appears that lake level movements can be reasonably predicted so long as the lake remains below the maximum operating level (approx 488 metres). A study of the graph at Appendix IV shows that there is a reasonably constant fall of about 1/2 metre per month from June onwards.

Lakeshore Cultivation: (continued)

It is important that farmers start to cultivate as soon as possible so that the crops can mature before the extremely high temperatures of October and November (47°C is possible). The other possibility is to use the period of steady rise from February/March to June/July to grow an aquatic crop. There are deep water varieties of rice that grow in water as deep as 2 to 3 metres. The crop grows with the rising flood. Trials are being undertaken at Kalabo in Western Province and contact needs to be maintained with the Rice Coordinator at Mansa Regional Research Station, PO Mansa. If an early approach is made it should be possible to plant a trial in March 1989. In the meantime it may be possible to obtain a small sample of seed from IRRI in the Philipines.

Another opportunity for rice production may arise in the dambo-like depressions found around the lakeshore. There is one behind the staff houses at Munyama. Depending on how much the lake rises such areas could be used to retain lake water or, if a low dam were built, to retain run-off from the surrounding area. Some trials with small dams as well as stone lines across inlets from the lake could be continued. OXFAM have considerable experience with stone lines in the Sahel (contact Mike Edwards for details).

7. Lake Level Fluctuations:

The future pattern of lake level movements are important to everyone on the lakeshore. They affect harbour provisions, the Munyama slipway, pump sites and a host of people who are now living semi-permanently below high water mark. Several islands would be inundated by a 6 metre rise which in 1973/74 took place between late December and late March.

According to CAPCO, if the rains come their aim will be to get the level up to 485 metres as quickly as possible. It could stay there for a few months but whatever happens there is always going to be a fall from sometime between mid-May and mid-July. Once the fall starts it does not come up again until December at the earliest and usually sometime in January.

Lake level fluctuations are not now likely to be as drastic as they were in the early days when a design rule curve was used to determine when to open the big gates and allow the dam to spill. Due to the flood warning system that is in place, with daily radio readings sent to Harare, there is more time in which to act to prevent a dangerous rise in the lake level. CAPCO are all prepared to spill in April 1988 if there is sufficient rain but spillage is something to be avoided wherever possible because of the scour hole it leaves at the base of the dam.

8. Irrigation from the Lake:

For those who are used to irrigation it must seem to be obvious that the lake should be used for growing crops in the dry season. At present there seems to be no restriction on the removal of water from the lake in spite of the low levels and the fact that ZESCO claim that all available water in the River Kafue has been allocated.

The water is of an excellent quality for irrigation and contains few salts. There are however, serious limitations:

- a) the only economically viable power source for pumping water is electricity and the nearest power source is at Siavonga. Electricity may be extended to Buleya Mulima but at present the only lakeshore supply is at Sinazongwe.
- b) a viable irrigation scheme would require a large area of deep fertile soil which is relatively flat. No such area has yet been identified in the GVAM area.
- c) to meet the requirement of sustainability in a situation of acute shortages of foreign exchange the scheme would need to generate its own foreign exchange - as is being done by the Gwembe Valley Development Company.

For the above reasons it is recommended that irrigation should be undertaken on a very limited scale. Wherever possible it should be confined to the draw-down area and used as a supplement to natural water. The use of petrol or diesel pumps should be avoided except on an experimental basis or for nurseries etc. Maximum use should be made of hand pumps that are available and have spares available in Zambia. On an experimental basis wind powered pumps should be tried, in particular the ITDG windmill being made under licence by Stewart and Lloyds in Harare.

According to the GTZ Project Study winds of up to 75 km/hour develop in the lake area and gales can last for 30 hours or longer. Anyone who has tried to sail on the lake will know that there are also periods with no wind at all. The main wind pattern is:

September to November: highest speeds from North
December to March : squalls and thunderstorms
April to August : cold, dry, southeast winds

The Gossner Service Team are working on windmills at Buleya Mulima and should be consulted. At Siatwinda the 2 team houses with small gardens have had a continuous supply of borehole water from a windmill since the 1970's. A 1,000 gallon tank has proved adequate to tide over windless spells. Mean wind speeds for Binga and Chipepo for the period 1960-70 are as follows:

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	
Binga	8.8	8.6	9.4	10.1	18.6	7.9	6.8	6.8	7.2	8.3	8.3	8.0	km/hour
Chipepo	4.7	5.0	7.2	7.9	6.5	6.1	5.0	5.8	4.3	4.7	5.0	4.7	

In addition to windmills there are other low cost, appropriate methods of lifting water. The new oxenisation team in Mulungushi House (Mr Dibbits i/c) have been contacted about using oxen for raising water from the lake. One possibility is a scoop similar to the scoop used for dam making that could pull water up the contour to empty into a channel.

The crops grown in lakeshore gardens include green maize, okra, pumpkins, sweet potatoes, rape, tomatoes, cabbage, chomoellier, Irish potatoes, beans, egg plant and carrots. As the weather gets hotter from September the more temperate vegetables start to shrivel in the heat and probably need to be grown under shade netting. (At Munyama up to 80 percent shade nets are being used.) The main crop where the lakeshore cultivators seem to have an advantage is okra and buyers have been travelling from Lusaka to buy okra at Siatwinda. Siavonga being that much nearer Lusaka would have a slight advantage. Possibly some of the fish buyers who come to Munyama and other lakeshore villages could be persuaded to try marketing okra as well.

The problems associated with expanding lakeshore cultivation are numerous but on the other hand this area has much more potential than rainfed production. Six crops of green maize per annum is something it would be difficult to match in other parts of Zambia. Then there are the opportunities to beat plateau producers by producing the more heat-loving vegetables during the winter period of June to August. The problems that need to be addressed include:

- a) Fluctuations in the lake level (see section above)
- b) Protection from game and domestic livestock (see fencing)
- c) Various disease and insect problems (eg Red Spider Mite) particularly in the hot months of October and November
- d) Low cost methods of pumping/channelling water
- e) Getting across the need to plant early in the draw-down period
- f) Teaching farmers to recognise drought stress and the importance of adequate watering
- g) The removal of Kapinga (Torpedo Grass/Panicum repens)

The fact that the area under cultivation is likely to vary from year to year has some advantages in that it ensures that some rotation takes place and should also help to control weeds other than Kapinga as well as eelworms.

9. Emphasis on Perennial/Tree Crops:

Existing agriculture is almost entirely based on annual crops which are all extremely vulnerable to a failure in the rains either in quantity or distribution. Carefully selected tree crops such as cashew, or shrubby perennials such as pigeon pea, have the great advantage that they are less dependent on rainfall.

Emphasis on Perennial/Tree Crops: (continued)

A complete crop failure with maize can be caused just by a 3 week dry spell at a critical period such as pollination. Once a perennial crop has its roots well down it can withstand a dry spell reasonably well. In the case of mangoes and other tropical fruits flowering and thus fruiting occurs in two year cycles so that it sometimes happens that a heavy crop is produced in a dry year and a light crop in a wet year.

The people of the Gwembe Valley - the Gwembe Tonga - have a long tradition of depending on perennial plants for food. Dr Scudder has documented this in several publications and in particular the UNZA Institute of African Studies paper "Gathering Among Woodland Savannah Cultivators: A Case Study: The Gwembe Tonga". He shows how various grasses are utilised in a drought year to replace the cultivated staples. Fifty two species are listed as providing fruits and nuts many of which are trees. Some of these have developed into significant cash crops and are transported to the plateau towns and Lusaka. Some, such as the Baobab, are bought mainly by Gwembe Tonga who live in town, while others such as Tamarind and Musau have been widely adopted by Zambians as a whole. It would be interesting to obtain more information about this trade and whether it increases as a response to famine.

The tree crops mentioned above, with the exception of Musau, are found in the wild and there seems to be no long tradition of planting tree crops. However, Scudder describes a well developed system of ownership of trees such as Tamarind and the discouragement of non-owners from harvesting the fruit. Alexander Kazenzi reports that many farmers clear around Musau trees and the Forestry Department at Lusitu once started a nursery and distributed seedlings of this tree. Other trees which are tended and planted include Mango, Paw Paw, Bananas and a tree which could well be called The Relish Tree. Large number of these trees were found to be growing around compounds in the Siatwinda area of Gwembe South but are not common in the lakeshore area of Gwembe North.

In Appendices V and VI are lists of perennial/tree crops that could be emphasised in extension work. Much intensive instruction and follow-up will be needed if a substantial number of trees are to survive transplanting into what is quite a harsh environment, particularly when the trees are young. To get started, each cooperative should be encouraged to have a tree nursery and demonstration orchard, preferably with some irrigation by hand pump or windmill. Towards the end of the rains it is often possible to collect seedlings of Baobab, Tamarind and Musau in the wild. These could be helped through their first dry season in the nursery and then sold to members the following rainy season. For transporting they would need to be grown in plastic sleeves or small baskets made locally.

10. Livestock Development:

Livestock already have a substantial role in the economy of the Gwembe Valley and this is backed up by the recommendation for Class V land which states: "The extensive form of cattle ranching or game ranching is the only sound system for this region".

Mr Massimo Selicato, an Italian citizen, claims to have a lease on the Kota Kota Peninsula which lies at the southern end of the GVAM area near to Chipepo. He intends to create a game ranch by fencing off the 4 km neck of the peninsula. The area already has some game - elephants, buffaloes and antelope - but others may be introduced including possibly ostrich which are already being kept on a crocodile farm on the Zimbabwean side of the Chirundu bridge. The ranch is likely to be multi-purpose, covering trophy hunting and game viewing, but appears to have few benefits for the local people, some of whom will be moved. As of November 1987 a licence to run a game ranch was still awaited.

The use of land for managed wildlife makes sense particularly in the case of Kota Kota because it is a mountainous area which is not suited to agriculture. Zimbabwe is experimenting with a wide range of game management systems some of which are designed to serve scattered village communities. However, in most cases they are in areas with more game and less domestic livestock than on the Zambian side of the lake. There may be other hilly areas similar to Kota Kota where game management is possible and it would be a good idea to look into this further. Professor Murphree of the University of Harare has been helping to start such schemes in the communal lands and would be willing to advise. He is also connected with the Sebungwe Project which is doing research in the Tonga area of Zimbabwe including the lakeshore at Binga.

The main potential for domestic livestock lies with cattle, sheep and goats. According to Leo Goodfellow both tsetse flies and ticks are less of a problem in the lakeshore area than they were in their previous base at Ibwe Munyama on the escarpment. No regular dipping or spraying has been practised and it appears that there are considerable numbers of ox peckers that help to keep down numbers of ticks. There is an EEC programme to clear the entire Zambezi Valley area of tsetse fly and the first area to be cleared in Zimbabwe using the new tsetse target system lies between the Kariba dam and Chirundu. This was a major source of infection for Zambia particularly as game came regularly across the river in this area. The target system is very simple, relatively low cost and lends itself to use in relatively small areas. If at any time tsetse proved to be a problem it should be possible to clear them relatively quickly after contacting the Department of Veterinary Services in Lusaka.

Livestock Development: (continued)

The lakeshore area has considerable potential for livestock because it is now covered with a grass called Kapinga or Torpedo Grass (*Panicum repens*). This establishes in almost all soils where the lake has once covered the land but on the other hand seems to survive long periods (5 years) without flooding. Since at considerable distances from the lake it often has green shoots in the dry season it must be deep rooted.

Dr Magadza of the University of Harare Kariba Research Station thinks that in some areas it is being replaced by *Cynodon dactylon* or couch grass. However, this also has some potential as a grazing grass and is probably easier to control.

Control of Kapinga is a major limitation on using the draw-down area. The underground creeping stems or rhizomes are extremely difficult to get rid of with a hoe or ox plough. However, this would be made easier if forked hoes were used rather than the normal hoe which has a blade which cuts the rhizomes into pieces and so may actually spread the grass. Forked hoes should be obtained for trial or made in the workshop at Munyama. A spiked harrow pulled by oxen after ploughing should assist in dragging out the rhizomes. An effective harrow can be made from either timber or steel.

Techniques which could be taught using the Veterinary Department staff at Siavonga include the following:-

- a) Castration using a Burdizzo but taking care to leave adequate numbers of the best males, for breeding
- b) Dosing for worms using a drenching bottle and after ensuring that the co-ops have stocks of worm medicines
- c) Ageing by mouth with the idea of teaching farmers to regularly cull their animals for slaughter. Contact Lusaka butchers with a view to sending a trial load of animals. They could be driven to Kariba Store area for loading.
- d) Treatment of wounds or lesions as in the case of sheep/goats affected by mange with an antiseptic such as Stockholm Tar or lime sulphur-nicotine sulphate and/or BHC mange dip. The first is to control secondary infections and the last 2 are to control the mites which cause mange.

11. Fencing:

There is no doubt that control of livestock is critical to the successful development of the lakeshore zone. During the rainy season crops are grown so widely that it is expected that livestock are herded in other areas and penned up at night. However, once the dry season starts this practice gives way and often livestock are left to graze fairly freely.

Fencing: (continued)

This needs to be discussed in the cooperatives to find out if there is a consensus for greater control over livestock. Penning is not entirely an answer because as fodder gets in shorter supply the animals need more time for grazing. Also animals will need to go to the lake at least once a day for drinking.

One system that could be tried with sheep is the Bonnox moveable pen. This is a wire pen holding about 30 sheep that is moved by about 4 people once or twice a day. On good quality grass during the rains or up to about June it should work well and has the advantage of both controlling worms and giving access to fresh grass. The cost of one unit is about £30.

Wire fencing has the major disadvantage that it requires foreign exchange and even if the system worked well it would be difficult to justify economically. At present most fencing is made with poles cut in the bush or with branches of thorny Acacia shrubs. Neither are very permanent and involve a lot of work which has to be repeated frequently as the termites destroy the fence. There is therefore a strong case for finding ways of providing "live" fences that would last for many years.

In Kenya one whole district (Kericho) was fenced over a period of 5 years using a hedge plant called Mauritius Thorn. Admittedly this was in a high rainfall area but the same plant was used widely by Rhodesian white farmers to protect their homesteads during the Zimbabwe war of Independence. In the Appendix a number of species are recommended for trials. Producing a stock proof hedge is not just a question of selecting the right species and planting it. Much care and infilling will be needed and the plants will need shaping so that they fill out at the bottom and do not become leggy. A good short stock proof rubber hedge can be seen at the primary school in Kanchindu in Gwembe South. Charara Estates in Zimbabwe have an elaborate elephant proof fence which includes a sisal barrier. The sisal would take 4 to 5 years to become stock proof and some irrigation in the first year or two.

12. Bird Problems:

One of the issues which came up at the Farmers/Cooperative Committee members Seminar in Siavonga (12-23 October 1987) was that of bird damage to crops. Several species are probably involved but by far the most serious is the Quelea which is known to be a problem throughout the region at elevations below 1,000 metres above sea level. Several farmers described being on the lakeshore at dawn and hearing repeated sounds like a jet plane going over their heads as the birds came in over the lake.

Bird Problems: (continued)

Older farmers said they could remember bird problems when they were young but they were not as serious as nowadays. Before the dam they would look out the sites during the breeding season and collect young fledglings for relish. Nowadays they are unable to do this because in their opinion the breeding sites are in Zimbabwe.

Fortunately, Zimbabwe has a Quelea Control Unit based in Harare at the National Parks offices. This unit already has an international problem with Quelea flying from the Hwange National Park to a wheat scheme in neighbouring Botswana. It seems possible that Quelea fly to Zambia from the Matusadona National Park which is just within the normal range of Quelea. If approaches are made through the proper channels it seems quite possible that some control measures could be undertaken in the near future.

In the long-term there is a proposal for a SADCC coordinated migrant pest control set-up. Control is normally by aerial spraying where numbers are over 100,000. Ground spraying is also possible and active work is going on to develop live catching using nets, with a possible export market to Spain and Italy.

In the meantime farmers will need to step up their organisation to combat birds in the present season. Much could be done by cooperative action so that the susceptible crops, sorghum and millet, are grown in blocks rather than in isolated pockets. Cooperation in bird scaring may also be possible if the crops are grown in a block.

Another measure that is being recommended for trial is mixed planting of a tall maize variety (MM 504 or R 201) with a short sorghum. For the present ZSV 1 is being recommended but the new varieties MMSH 178 and SDS 3136 are even shorter. The principle, which was worked out by contact farmer Adam, is that the scouting parties of Quelea are fooled into thinking that the field is all maize. This possibility is confirmed by the Quelea experts since Quelea have a well developed system of pioneer birds whose job is to find new feeding areas. The idea of testing this method has been welcomed by Dr Verma of Mount Makulu and Dr Willey of the University of East Anglia, a world authority on mixed cropping. When planting is done by hand the practice has few additional costs and has an additional insurance benefit in that if the maize crop fails the farmer has the sorghum to fall back on.

13. Bee-keeping:

Bee-keeping has never been developed in the Gwembe Valley and there appears to be no tradition of using bee products like honey and wax on any scale. However, this fact apparently bears little relation to the potential for bees.

Bee-keeping: (continued)

Timothy Chupa of the Bee Research Unit in Cardiff confirms that the whole of Zambia has a high potential for bees but that bee-keeping practices have only developed where people are used to dealing with bees. A quick study of the Directory of Honey Sources reveals that many of the important trees in the Gwembe have an N1 nectar rating, indicating that they are a major source of surplus honey. These include some of the trees already mentioned such as Tamarind and Musau. Acacia Albida is known to be an excellent tree for bees.

The vegetation in Botswana is similar to the Gwembe Valley but the climate is even harsher. Yet the country now has an embryo bee industry, thought to have reasonable potential. It so happens that a pioneer of bee keeping in Botswana is now working in Zambia at the GTZ (West German Aid) project in Kabompo. His name is Bernard Clauss and he made a name for himself by training school children to handle bees without protective clothing.

The head of the Bee Unit in Botswana is a lady and it is possible that she could attend a womens seminar in Siavonga to give an introduction to bee-keeping. However, first it is suggested that Mr Clauss be invited through the GTZ team in Siavonga to visit the area to determine:

- a) the extent of any existing use of bees
- b) the potential for bee keeping
- c) the group or groups that might be worked with. The problem with introducing bee-keeping amongst school children, particularly at secondary level, is that a high proportion will end up in jobs where they do not pursue this skill.

14. Agriculture Inputs/Spare Parts, etc:

This was one of the major points raised by farmers in the seminar already referred to. Siavonga has no agricultural input depot and the one at Lusitu is not well stocked. However, even in Lusaka there is a dearth of critical inputs such as ox plough parts, flat shares, bolts and nuts and wheels. It is absolutely essential that priority is given to this aspect for the 1988/89 season and action should be taken in about June or July. If supplies are not forthcoming in Lusaka or Mazabuka then there would be time to organise them from Harare. Dependence on Zimbabwe inputs should be avoided, but where a gap exists in normal supplies within Zambia then it would seem to be a high priority use of aid funds and one which donors would support. Some addresses and phone numbers of potential suppliers are given in Appendix VIII.

15. Fishing:

As indicated at the beginning this is not strictly agricultural but, as the main under-utilised *resource, must be mentioned. The people of the lakeshore, in spite of all the disruption caused by being moved from the river, are nutritionally and economically better situated than many other people in Zambia. This is because they are sitting next to a major source of high quality protein food.

In an interview in Lusaka Dr Elizabeth Colson described the efforts to develop fisheries when the lake first filled up. Prior to independence fishing on the lake was reserved for the Tonga but opened up afterwards. The main fish camps were extremely active places and the higher organic content of the lake as it filled created an explosion in fish numbers which later slumped. At one time an ice plant was planned for Sinazongwe and fish markets built at various points including Mamchamywa in the GVAM area. The Tonga people apparently had no tradition of fishing from boats and when fishing opened up the initiative was taken over by fishermen from other parts of Zambia and Malawi.

* For details of fish species see Appendix IX 5.
Fishing: (continued)

However, the biggest obstacle to the development of a Tonga fishing industry was probably the Zimbabwe war when, because of frequent incidents on the lake, fishing from boats was banned by the Zambian authorities.

Much has happened since 1980 and fishing is on the increase. Again however, much of the initiative has come from outsiders. Kapenta fishing, using rigs with diesel generators and deep water lights, has been taken up by assorted people mainly from the white settler community. Many islands are now occupied by Bembas or other non-Tonga people who fish mainly for bream which are dried and shipped to Lusaka. There are also a number of fish buyers including one who comes regularly to Munyama by road to buy dried fish or, if ice can be organised, fresh fish.

A DANIDA/NORAD funded programme for developing fishing is just getting off the ground at the Lake Kariba Fisheries Research Institute in Zimbabwe. The programme is designed to serve both countries and will build up the Sinazongwe Fisheries Training School. A Danish Volunteer at Siavonga is an experienced fisherman and is keen to develop training at the Gwena Farm School. All these initiatives need to be carefully followed and drawn on. A seminar on fish could be held at Siavonga and various Zambian and Zimbabwean officials invited. Save the Children Fund/UK have a programme to sponsor cooperatives to operate Kapenta rigs in Zimbabwe.

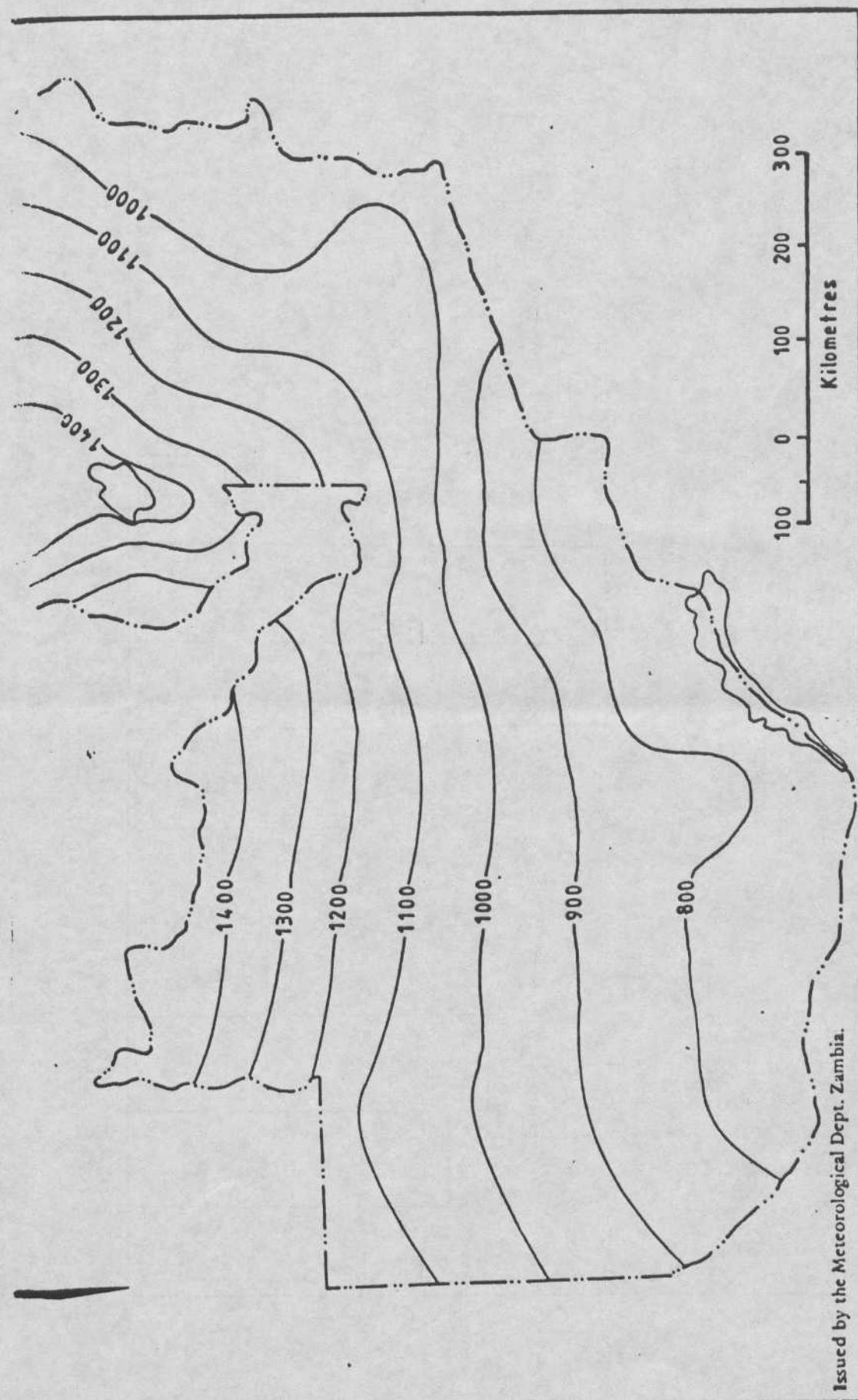
Fishing: (continued)

If fishing and other non-agricultural activities can be developed the need for famine relief in a year of poor rainfall should be gradually reduced. This is because the community will have moved away from being a subsistence economy. Already there is a tendency for fishing to increase as a response to drought. This tendency should be encouraged to a point where those in the valley get much of their staple food, maize, by selling fish to those on the plateau, who are much better placed to produce it.

Much of the problem surrounds marketing and some trial purchases of dried fish by the cooperatives need to be started to see whether a better price can be obtained by direct sales to Lusaka. Since government control over net sizes seems to have collapsed perhaps cooperatives could appoint their own bailiffs to inspect nets and remove those that are too small.

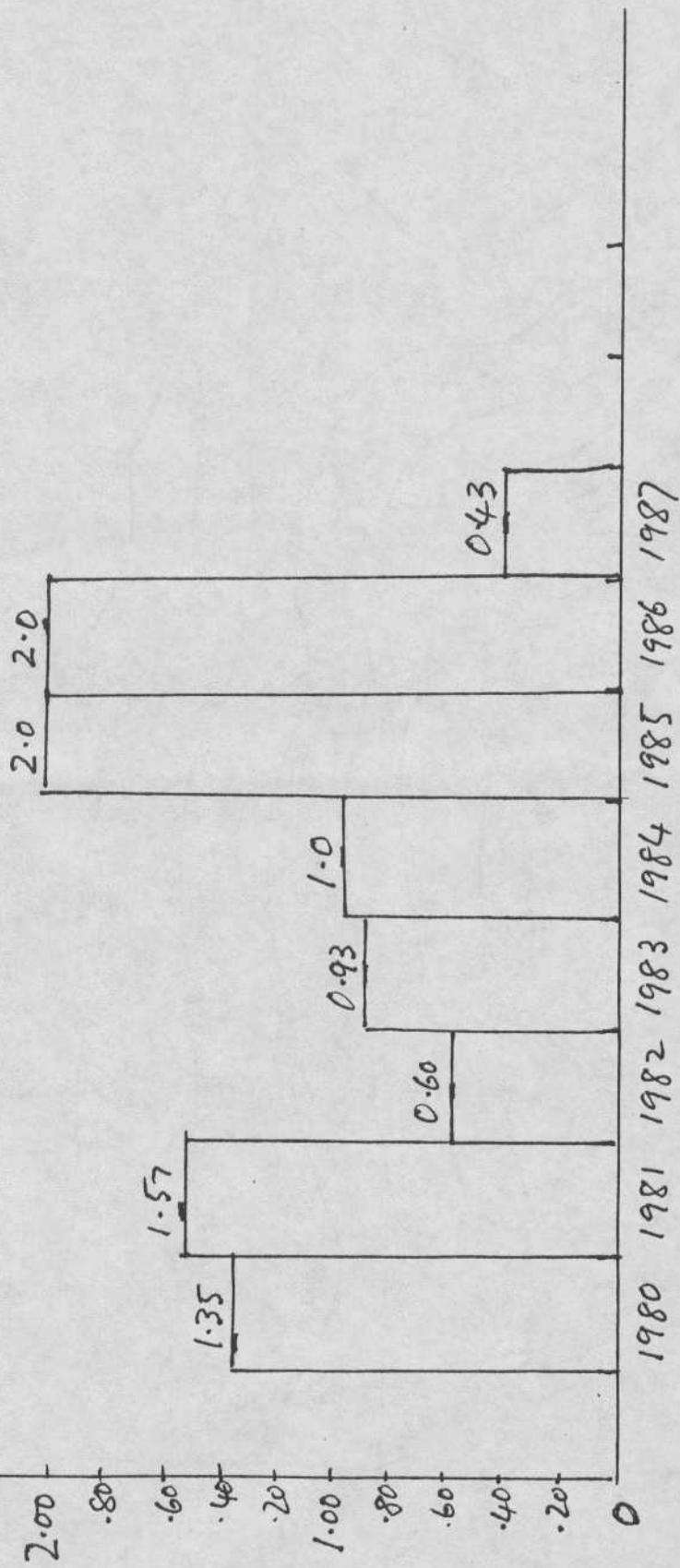
16. Extension Messages:

Appendix X was used for the farmers' seminar held in Siavonga in October 1987. Although most of the messages have not been sufficiently tested, they all involve a low level of risk for the farmer or they are couched in terms that encourage farmers to try the technique on a small-scale. These are preliminary messages for 1987-88 and will need revising for 1988-89.



Million
Kgs

COTTON PRODUCTION IN
THE SIAMONG AREA (S. PROV. 2AMBIA)



ERW
20-9-87

APPENDIX III

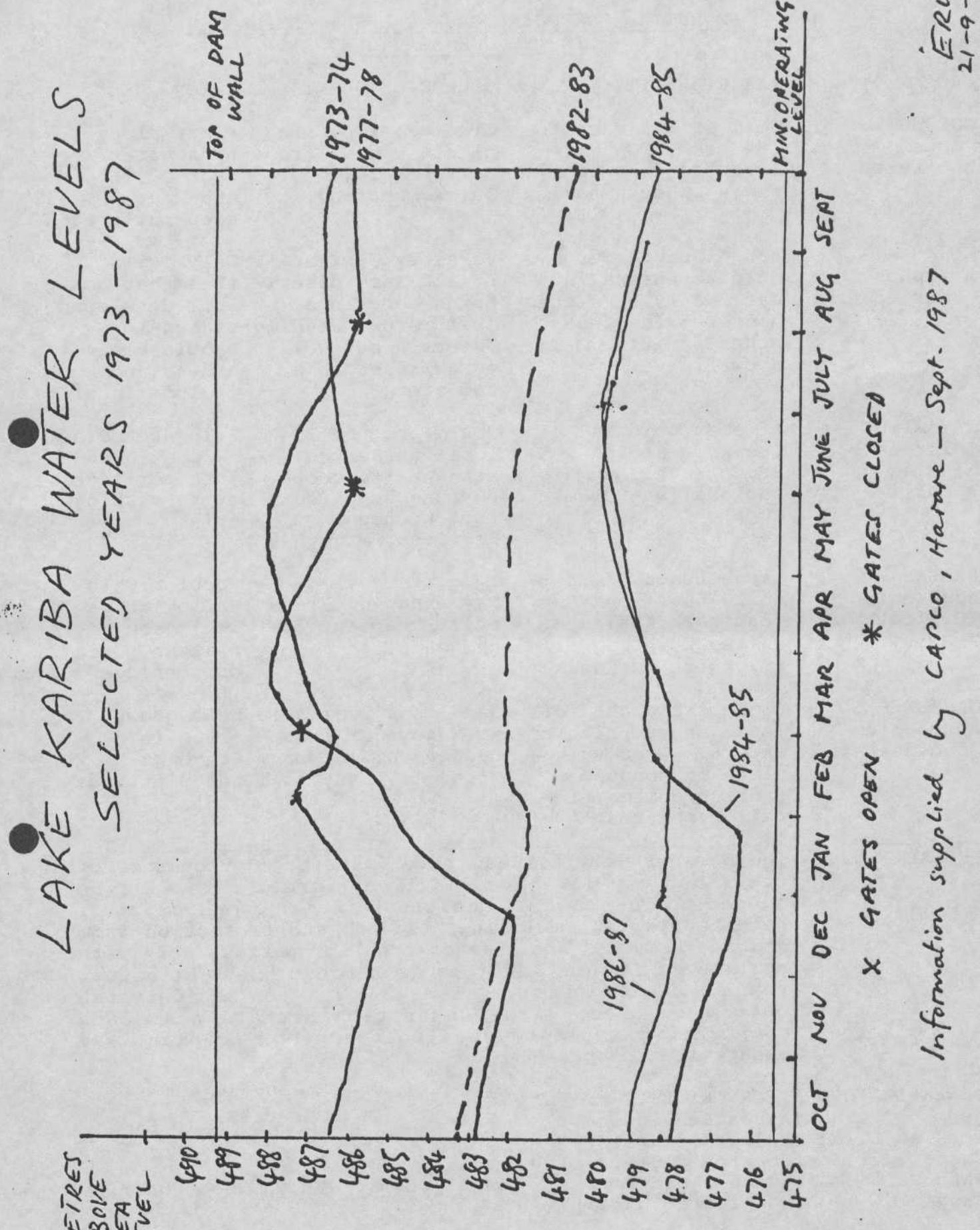
EXISTING AND POTENTIAL RAINFED CROPS GROWN IN THE
GWEMBE VALLEY

CROP	MARKETABILITY/USAGE	SEED	NOTES
SORGHUM:			
Lusili	Brewing/Brown type	Saved locally	Short height
Longo	Brewing/Nshima	ditto	Tall. 6 months
ZSV 1	Coops reluctant to buy in past	Zamseed have plenty (Oct 87)	to mature.
MMSH 178	New/not known	Winter nursery at GVDC for free distribution	Poor storage
	White, high yielding hybrid	? Zamseed 1988	Pre-release var.
SDS 3136	New/not known	ditto	Gave 1 1/2 tons at Lusitu (ZSV 1 gave 1/2 ton) 145 mm rain
	White, high yielding composite		Probably more suited because seed retainable
PEARL MILLET:			
Inzembwe (Tonga)	No organised market through coop union. Grown mainly for subsistence	Zamseed had 1 var. - Uganda 1987 New varieties being developed	Grows well in low rainfall but more susceptible to dry periods
FINGER MILLET:			
Mabele (Tonga)	ditto	Plant breeders are developing new varieties	Grown as a catch crop/quick maturing
MAIZE:			
	Most marketable grain crop. Surpluses exported in past	Zamseed usually have a range	MMV 400 most useful
COTTON			
	Well organised and reliable. Quick payment. Main cash crop	Seed supplied on credit by Lintco	Drought tolerant
SOYA-BEAN			
	Few people know how to use so sold-Lincto	Also chemicals from Lincto	Useful crop
COWPEAS			
	Used locally and potential export	Zamseed stock	Not drought tolerant. High risk
GROUNDNUTS			
	ditto	Shipepo variety	Drought and heat tolerant
SUNFLOWER			
	Difficult to use b/c No processing facilities. Marketing not yet well organised	Zamseed has seed available	Other varieties not drought tol.
GUAR			
	Small market-green Seed market not developed	Small quantities from Shell Chemicals	Local processing recommended but discouraged by govt. subsidy
CASSAVA			
	Govt has listed price for dried chips	Plant from cuttings. Improved variety - Mansa	At expt. stage but high potential
SWEET POTATOES			
	Local market only at present	Plant from cuttings. Improved variety - Mansa	V. drought tolerant
BAMBARA NUTS			
	Used locally	Zamseed do not stock	V. drought tolerant
OKRA			
	Used locally but S. Gwembe have large areas for sale to Lusaka	Zamseed stock Clemson	Encourage as reserve
			NIRS (Mazabuka) have variety that grows in water
			High protein food
			Grown with rain or draw-down. Best grown in winter

APPENDIX III (continued)

EXISTING AND POTENTIAL RAINFED CROPS GROWN IN THE
GWEMBE VALLEY

CROP	MARKETABILITY/USAGE	SEED	NOTES
TOBACCO	Used to be important cash crop. Now for local sale	Saved locally	
PUMPKINS/ MELONS	Local only except in winter	Zamseed stock	Good winter crop



Information supplied by

X GATES OPEN * GATES CLOSED

ER₂ω
21-9-87

CARCO, Harare - Sept. 1987

APPENDIX V

POTENTIAL PERENNIAL CASH CROPS TO EMPHASISE
IN THE GWEMBE VALLEY

CROP	MARKEABILITY	SOURCE OF PLANTS	NOTES
COCONUT - <i>Cocos nucifera</i>	Sell at K40 each to traders in Choma. Imported from Tanzania & South Africa	GTZ team importing plants & nuts from Dar-es-Salaam Quick maturing	Plant along high water mark of lake and near coop building
MUSAU - <i>Zizyphus Mauritiana</i>	Large quantities sold to Lusaka in April-July. Fetches higher price than other fruits. Only grows in valley	Forestry Dept at Lusitu have distributed seedlings free. Grows readily Imported but well-established in a few areas	Only "wild" tree that has well-developed ownership People clear around and include in plot
TAMARIND - <i>Tamarindus Indica</i> T-Musiika	Already sold in Lusaka. Stores well Zambezi Valley main national source of supply	Could produce in local nurseries attached to coops 2 trees supplied from Lusume Services, Magoye	Pulp sucked as a sweet. Made into porridge or refreshing drink
BAOBAB - <i>Adansonia Digitata</i> T-Mubuyu	Large heaps of 20 to 30 bags seen on road near Lusitu - waited 2 weeks for transport to Lusaka	ditto May find seedlings and transplant to chosen site	Popular with Valley Tonga living on plateau. Drink or porridge
CASHEW - <i>Anacardium Occidentale</i>	High-priced nut for local consumption or export. Processing plant in Mongu but frost problems. In valley no frost	Seedlings available at Magoye or from Cashew Co. in Mongu Siavonga Grows in sandy soil and Siatwinda	Well-grown trees in

PRECAUTIONS - The Gossner Service Team have distributed thousands of trees but very few have survived. Great care will be needed to instruct on choice of sites, preparation of holes, watering, mulching, shading and protection from goats. Termites are a major problem, particularly with cashew and Lusume Services have found they get better results if the plastic sleeve is left on and only the bottom removed. A demonstration orchard near each cooperative could be used to teach how to plant and manage tree crops.

PERENNIAL CROPS FOR TRIALS:

Neem (Azadarach Indica)
 Persian Lilac (Melia Azedarach)
 Carob (Ceratonia Siliqua)
 Date Palm (Phoenix Dactylifera, being grown in Venda, South Africa)
 Mango (Mangifera Indica)

APPENDIX VI

POTENTIAL PERENNIAL CROPS FOR LOCAL USE
IN THE GWEMBE VALLEY

CROP	USES	SOURCE OF PLANTS	NOTES
RELISH TREE Moringa Oleifera T - Kapulanga Zakalandia	Increased availability of relish particularly in drought years Once accepted for human food extend: 1. Livestock 2. Alley cropping	Grows from cuttings or seed and appears to be much less vulnerable to drought & termites Farmers on seminar supplied with cuttings Lusume Services sell	Large numbers grown and cared for in Siatwinda area Not known in other areas
FERTILISER TREE/WINTER THORN Acacia Albida T - Musangu	Famine food tree - seeds need 24 hrs processing to remove HCN Acid Leaves drop in Dec. and dug into soil	Trees obtained from Lusume Services, Magoye and Mr Franklin of Makeni. Could find seedlings locally	First introduced to agro-forestry Popular tree Plant in cotton fields
PIGEON PEA Cajanus Cajan	Edible peas eaten fresh or after drying. Leaves and stems good fodder and still green in July	Seed supplied by Msekera Research Station, Chipata Bulk at Munyama for local use	Trials already conducted at Munyama Growth good Pod fill poor ? due drought

APPENDIX VII

POTENTIAL/SPECIES FOR LIVE FENCING TRIALS AT MUNYAMA

PLANT	CHARACTERISTICS	NOTES
SISAL Agave Isisalana	After 1 to 5 years produces stock proof fence	Probably too slow growth unless watered frequently
RUBBER HEDGE	Widely used in Botswana to fence compounds. Not very stock proof Latex is an irritant	Common in Gwembe South and Lusitu. Plant in dry season without watering
ACACIA ALBIDA (Winter Thorn - see above)	The loss of leaves during the wet season reported to be an adaptation to seasonal flooding May have potential for fencing in the draw-down area.	Plant avenue from house to mooring to test resistance to flooding. Seedlings supplied
MAURITIUS THORN Cesalpinia Decapetala	Large hook thorns and shrubby habit. Grows 2 metres in 18 months. Used Kenya for stock and in Zimbabwe during the war	Obtain seeds from Zimbabwe. Danger of becoming a weed
ACACIA HOLOSERICA	Used for live fencing and fodder Grows fast & in poor soils. Shrub-like. 2 metres in 18 months	Available from Lusume Services 10 supplied

APPENDIX VIII

POTENTIAL SUPPLIERS OF AGRICULTURAL INPUTS
AND EQUIPMENT

ITEM	SUPPLIER	NOTES
1. New ITDG Windmill	Stewart and Lloyds 37 Moffat Street Harare. Tel: 708191	Previously made in Kenya
2. Forked hoe	Karina & Co, Cha Cha Cha Road, Lusaka	Locally made Npt strong
3. Hand operated equipment for expressing oil from sunflower	Lutanda Ltd. Lusaka and Kitwe Also from Royal Trop. Institute, Linnaeusstraat 2, 1092 CK Amsterdam The Netherlands	Cost K63,000 but locally made
4. Moveable sheep pen	Bonnox Ltd. RSA (see SA Farmers Weekly)	Developed the proto- type which has now been taken up by Lutanda
5. Chisel Plough for use with oxen	Bulawayo Steel Products PO Box 1603, Bulawayo	Cost R96. For trial on draw-down area Could make up at Munyama from old ploughs and cultivator tines
6. Plough parts	Namboard, Lusaka Bulawayo Steel Products & other Zimbabwe companies	
7. Hippo Mills sizes 1 and 1 1/2	Precision Grinders 55 Craster Road Southerton, Harare Tel: 65631. Box 1780	Bought patent from South Africa
8. Lister Engines	Stewart and Lloyds - as above	
9. Grafted Mangoes (also green man- goes & peach mangoes	Marlborough Nurseries Tel: 36699 Harare	Ready in April 12-50 dollars each
10. Virus free citrus Navel & Valencia on Rough Lemon	Mazoe Citrus Estate PO Mazoe G M - Mr Worthington	Also some mangoes certified budwood
11. Fencing materials and gates	Afgate, PO Box 66020 Harare Tel: 64377/63410	Factory and sales: Willowvale Road
12. New Lenco light plough	Lenco Ltd, Lusaka	New plough designed to meet farmers complaint that the original plough was too heavy for valley oxen
13. Treadle Thresher for rice	Chinese Rice Team Kafushi, nr. Keembe, Kabwe	Low cost and effective hand operated thresher
14. Scotch carts	Katopola Farm Institute PO Box 510132, Chipata Munzama Crafts, PO Box 40 Manyinga, Kabompo	Kits are available from Rumpstead, Netherlands & Farmkart Ltd, Dorset, Uk
15. Axles and bearings	SKF Ltd, Kitwe	
16. Trees - general	Lusume Services, Magoye	
17. Cashew seedlings	Zambia Cashew Co Mongu	

APPENDIX IX

ECONOMIC ENTREPRISES IN THE ZAMBEZI

VALLEY AREAS OF ZAMBIA & ZIMBABWE

1987

1. Indigenous tree crops sold for cash outside the valley
 - a) Baobab - large piles of bags seen on road near Lusitu
 - b) Tamarind - reportedly sold in season
 - c) Masau - sold in season in large quantities. Introduced but wild.
2. Cultivated rainfed crops exported:
 - a) Cotton - main organised cash crop through Lintco which supplies seed and chemical pack. Up to 3,000 growers in N. Gwembe
 - b) Maize - sales only in "good" years. 36,450 kgs. 81-82 N. Gwembe
 - c) Sorghum - marketing not well organised but has potential
 - d) Sunflower - 49,950 kgs. sold 81-82 in N. Gwembe. Potential once marketing organised - possibly by Lintco in 1988-89
 - e) Bulrush Millet - listed by DAO but no market organised.
3. Irrigated crops exported:
 - a) Okra - considerable irrigated and draw-down production from Siatwinda and Sinazongwe - lorries come from Lusaka to buy
 - b) Bananas - 2 smallholder schemes near Chirundu in Zambia Charara plantation in Zimbabwe. Export potential to Botswana
 - c) Pineapples - grown with bananas at Charara. Eelworm problems.
 - d) Coconuts - one 14 year old Charara and trials at Gatche-Gatche. 5 trees at Sinazese, S. Gwembe. Nuts sell for K40 each in Choma. GTZ introduction from Dar-es-Salaam started October 1987
 - e) Wheat - main enterprise with cotton on Gwembe Valley Development Company project in Sinazongwe. 23 centre pivots
4. Domesticated Livestock:
 - a) Cattle: mainly used for local consumption. Will increase as tsetse cleared. Potential for drawdown areas - few ticks
 - b) Goats: large numbers and erosion hazard where overstocked. Sales to Copperbelt restricted by free food and foot and mouth.
 - c) Sheep: small number but large potential on lakeshore
 - d) Pigs: found in villages. Limited potential for expansion
 - e) Ducks: mainly Muscovy. Lake types (?Peking) have potential
 - f) Chickens: found in villages. Limited potential for expansion

APPENDIX IX (continued)

5. Fishing:
 - a) Kapenta: Introduced species. Major industry in Zimbabwe and expanding in Zambia. Nearly all large-scale. High capital cost
 - b) Bream: very popular dried, fresh or frozen. Small-scale
 - c) Prawns: being developed in Zimbabwe on commercial scale
 - d) Schilbe Sole, Cornish Jack, Koro, Clarias, Bottlenose - all used. Frozen in Zimbabwe.
6. Wildlife:
 - a) Game ranching for meat, trophy and tourism. Italian claims to have secured lease on Kota Kota peninsula
 - b) Crocodile farming: 2 in Siavonga, several in Zimbabwe combined with kapenta fishing or game safaris.
 - c) Ostrich farming: being started at Chirundu (Zimbabwe)
7. Tourism:
 - a) Hotels in Siavonga mainly for local tourism/conferences.
 - b) Kariba has large-scale international tourism based on lake sports and wildlife. Zambia has Chobe Island - tours by boat.
8. Crafts:

Gossner Mission has developed a wide range of crafts for marketing in Lusaka and overseas
9. Precious stones:

Mainly amethyst. Sold on roadside but now illegal.
10. Mining/Oil:

Japs. recently decided to stop prospecting uranium.

GWEMBE VALLEY AGRICULTURAL MISSION

SUGGESTED EXTENSION MESSAGES 87-88

MESSAGE	EXPECTED EFFECT	HOW TAUGHT	NOTES
1. Plant relish trees around compounds T-Kapulanga (Moringa)	Increased availability of relish throughout year. Later extend uses - see notes	Demonstration of planting a cutting plus tree planting and watering	As becomes popular extend to 1. Livestock feed 2. Alley cropping
2. Plant Musau/Musau around compound and fields: (Zizyphus sp.)	Potential food and cash crop. Highest value local fruit. Only grows in valley	Demonstrate how to protect tree from fire, goats etc	Already substantial trade but not from lake-shore area
3. Explain seeds available through coops	Encourage use of drought tolerant crops and varieties. Planting dates. Re-Planting	Show samples of seeds and give out Zamseed Tonga crop guide	Discourage maize except on moist sites
4. Tied ridging	1. Try on a small area to test effect 2. Try first with ground-nuts, vegetables or sweet potato	Demonstrate on small-scale with watering can. Show Lusitu results	Area suffers from very heavy run-off Aim to show water conservation
5. Mixed maize/sorghum planting	Using Adams experience to deceive birds	Explanation and discussion Need tall maize and short sorghum	Use R201 and ZSV1
6. Vegetable growing in draw-down (lakeshore)	1. Plant more okra as cash crop 2. Plant earlier (June onwards) 3. Do more watering	Give sample packs or okra seed. Explain lake movements and drought stress	Aim to raise incomes and improve nutrition
7. Plant Musang (Acacia Albida -	First step in agro-forestry-fertiliser tree	Show how to handle plants and prepare hole	Tree well-known and seeds eaten
8. Forked hoe for removal of Kapinga grass (Torpedo - Panicum repens)	This grass is a major limitation to draw-down cultivation. Hoe should ease removal of roots	Demonstration with forked and normal hoe. Cost K65 to cut and spread Lusaka. Local manufacture possible	Normal hoe tends to cut and spread runners.



REPUBLIC OF ZAMBIA

MINISTRY OF AGRICULTURE AND WATER DEVELOPMENT

**GWEMBE
SMALL SCALE
IRRIGATION PROJECT**



AGRAR- UND HYDROTECHNIK GMBH
CONSULTING ENGINEERS · ESSEN · GERMANY

IN COLLABORATION WITH



AGRINDCO INTERNATIONAL LTD
LUSAKA · ZAMBIA



REPUBLIC OF ZAMBIA

MINISTRY OF AGRICULTURE AND WATER DEVELOPMENT

Von Troll 0201-2016229

GWEMBE SMALL SCALE IRRIGATION PROJECT

SIATWINDA PILOT IRRIGATION SCHEME
FEASIBILITY STUDY

VOLUME 1
MAIN REPORT



AGRAR-UND HYDROTECHNIK GMBH
CONSULTING ENGINEERS · ESSEN · GERMANY

IN COLLABORATION WITH



AGRINDCO INTERNATIONAL LTD
LUSAKA · ZAMBIA

JULY 1987

Z A M B I A

Gwembe Small-Scale Irrigation Project

Rehabilitation and Extension of Siatwinda Pilot Irrigation Scheme

Feasibility Study

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Abbreviations

AA	Agricultural Assistant
AgS	Agricultural Supervisor
ARPT	Adaptive Research Planning Team
CAPCO	Central African Power Corporation
CUSA	Credit Unions and Savings Association
DAO	District Agricultural Officer
EIRR	Economic Internal Rate of Return
FEC	Farmers' Executive Committee
FI	Farm Institute
GM	Gossner Mission
GST	Gossner Service Team
KfW	Kreditanstalt für Wiederaufbau
LINTCO	Lint Company of Zambia
MAWD	Ministry of Agriculture and Water Development
M&E	Monitoring and Evaluation
NAMBoard	National Agricultural Marketing Board
NIRS	National Irrigation Research Station
PAO	Provincial Agricultural Officer
SPADP	Southern Province Agricultural Development Project
SPCMU	Southern Province Cooperative Marketing Union
T&V	Training and Visit
TO	Technical Officer
ZAMHORT	Zambia Horticultural Company
ZAMSEED	Zambia Seed Company

Exchange Rates

Fixed Rate (May 1, 1987)

DM 1.00 = K 4.50

US\$ 1.00 = K 8.00

Shadow Rate

DM 1.00 = K 8.10

US\$ 1.00 = K 15.00

Z A M B I A

Gwembe Small-Scale Irrigation Project

Rehabilitation and Extension of Siatwinda Pilot Irrigation Scheme

Feasibility Study

S U M M A R Y

Background

The Siatwinda Pilot Irrigation Scheme was identified in the first phase of the Gwembe Small-Scale Irrigation Project studies for further study into the feasibility of its rehabilitation and extension. The scheme is located at the north-western shores of the Kariba Lake about 330 km (by road) north-west of Lusaka. The existing scheme of 30 ha gross was constructed in 1970/71 with assistance from the Gossner Mission of West Berlin. First plantings started early in 1972. The land was sub-divided into 0.2 ha plots and distributed to 75 cultivators.

Natural conditions in the area are rather unfavourable. The climate is hot with tendencies to semi-aridity. Rainfall is unreliable with drought years but also extremely wet seasons. The only permanent water source is the Kariba Lake. Soils are moderately good for crops.

People in the area have suffered from resettlement due to the construction of the Kariba Dam and the rising lake waters and from the liberation war. For all these factors the people of the area are considered as one of the poorest in the country.

The main economic activity in the area is rainfed agriculture with maize, sorghum and millet as subsistence crops and a little cotton and sunflower for cash. Due to the unfavourable natural conditions and the traditional cultivation practices crop yields are very low. Widespread famine occurs in years of drought. Livestock is kept mainly as savings for difficult years and for generation of cash for purchase of other requirements besides bare subsistence.

Irrigated agriculture was introduced to assure farmers a safe income and to supplement their subsistence cropping. Water is pumped from the Lake into the fields. When in 1982 the level of the Lake started to recede, operation of the scheme became increasingly difficult. Pumps had to be moved several times and finally additional pipes had to be laid over a distance of 1.7 km. When pumps broke down completely for lack of spare parts and replacements the scheme had to stop all operations. Only in the 1985/86 season did irrigation start again with new pumps on a reduced area of 12 ha partly sub-divided into 0.1 ha plots to accommodate all farmers of the scheme. Crops grown in the scheme are rice in the wet season and vegetables in the dry season.

The Project

The objective of the Project is firstly to rehabilitate the existing irrigation scheme in order that the present members of the scheme can safely generate an additional income which would make them independent from the risks of their rainfed cropping thus contributing to the improvement of their living standards. Secondly the existing scheme will be extended (together with the rehabilitation) by 30 ha and in a later stage by 90 ha with possibilities for even further extension in order that more farmers can participate in the scheme. The farm survey carried out indicates that sufficient farmers will be available in the area to participate in the Project. The Project will further serve as a pilot project for testing irrigated agriculture in an area where it is a new technique and for introduction of similar schemes in the region.

For the rehabilitation of the existing scheme and the first extension of 30 ha it is proposed to instal movable pump units at two stations situated at the low- and high-shore lines of the Lake. They will be connected to a buried pipeline of 2,500 m total length serving the irrigated areas both directly and via the night-storage tank. Which pump station is in operation will depend on the prevailing lake level. The extension area will be shaped for surface irrigation from water courses lined with prefabricated asbestos-cement sections.

An electric power line of about 25 km will be built from Maamba substation following the first part of the route of the existing overhead line to the farm of the Gwembe Valley Development Company near Sinazongwe and then the gravel road to Siatwinda village. This line will initially be energized to 11 kV but installed for an increase of power to 33 kV at a later stage when demand will rise. From Siatwinda village an 11 kV line will be laid up to the scheme where it will be connected to drive the motors of the pumps and other equipment at the scheme.

Irrigated land will be distributed in plots of 0.2 ha with some farmers getting more than one plot depending on their interest and labour force. Double cropping will be practiced with mainly rice, soyabbeans and some vegetables in the rainy season; and dry beans and vegetables in the dry season. Cropping of vegetables is scheduled to the extent possible to enter the markets when supplies do not abound and prices are more favourable. For land preparation more use of oxen will be made and a wider use of implements and farm tools is recommended. Cropping practices will be improved by using and correctly applying improved seeds, pest-control chemicals and fertilizers, by proper weed control, the optimal timing of the various activities, and by better harvesting and crop-storage methods.

To support on-farm development, credit facilities for the purchase of oxen and related implements and for crop inputs and farm tools will be provided by the Project. Administration of credit funds will be by the Siatwinda Self-help Savings and Credit Union formed by farmers of the scheme with support from the Gossner Mission. The Credit Union will be strengthened through additional staff and office facilities.

For the processing of the paddy of the scheme a rice huller of 600 kg/h capacity will be provided for the farmers' organization to be installed in an extension of the existing store. Farmers will pay for hulling of their paddy.

Transport of produce out of the Project will be assured by one truck of 7 t proposed for the first stage of development and a second truck for the second stage of development (90 ha). The trucks would be operated by the farmers' organization against payment by farmers for transport of their produce. Additional hired transport will be required.

For advising and training farmers in improved production techniques it is proposed to increase the present one extension officer to two in the first stage and 5 in the second stage of project development. The extension staff will get additional special training in irrigated agriculture. Provisions are also made for farmers' training. The personnel will closely work with the farmers' organization and the farmers but will remain under the Government extension services.

With adequate water in the scheme it will be possible to continue research work which was suspended due to the water problems. Research programs on an area of 4 ha in the existing scheme and of 2 ha on the first 30 ha of extension will be oriented to the needs of the farmers of the Project and the introduction of irrigated agriculture in the area. For better supervising the work of the present employees it is recommended to assign one experienced technical officer at the beginning of project implementation and an agricultural assistant during the second stage of implementation. Additional training of the research officers will be provided.

Since sufficient housing is not available, extra housing will be provided under the Project for the additional extension and research staff.

Implementation of Stage I of development (rehabilitation and extension by 30 ha) will be carried out over a period of 5 years. During Year 1 3 months of technical advice would be rendered to maintain the scheme at the present level and for tender procedures. During that year all administrative procedures will be completed for the implementation of the Project. Supply and construction of equipment and facilities would be in Project Year 2. Years 3, 4 and 5 will be years of full operation and production of the scheme. The main activities during these years will focus on training of personnel in the operation of the scheme, in water management and in improvement of irrigated crop production together with the introduction of the credit program, marketing efforts, and institution building of the farmers' organization. The further extension of the Project will be implemented after sufficient experience has been gained from the first stage, at the earliest beginning in Year 6 for a period of also 5 years.

The Project will be owned by the farmers' cooperative society which will have to be formed. The present farmers' organization is operating already like a cooperative, but is not registered yet. The administration of the cooperative will be strengthened to administer and manage the scheme. A monitoring and evaluation component for the Project is provided.

Technical assistance by expatriate professional staff is proposed for irrigation engineering and agricultural advice in a total of 51 man-months and 5 man-months for monitoring and evaluation over the period of 5 years for the first stage of implementation. In addition advisory assistance for institution building, for marketing, for input supply, and for implementation of the credit programme is required to be continued by the Gossner Mission.

Substantial yield increases of more than 200 per cent are expected from the Project which together with the increased area under irrigation will result in a total incremental production of about 190 t of rice, 200 t of potatoes, 150 t of onions, 130 t of cabbage and various quantities of other crops at full production levels of the first stage of implementation. Incremental production from the second stage of implementation will increase accordingly.

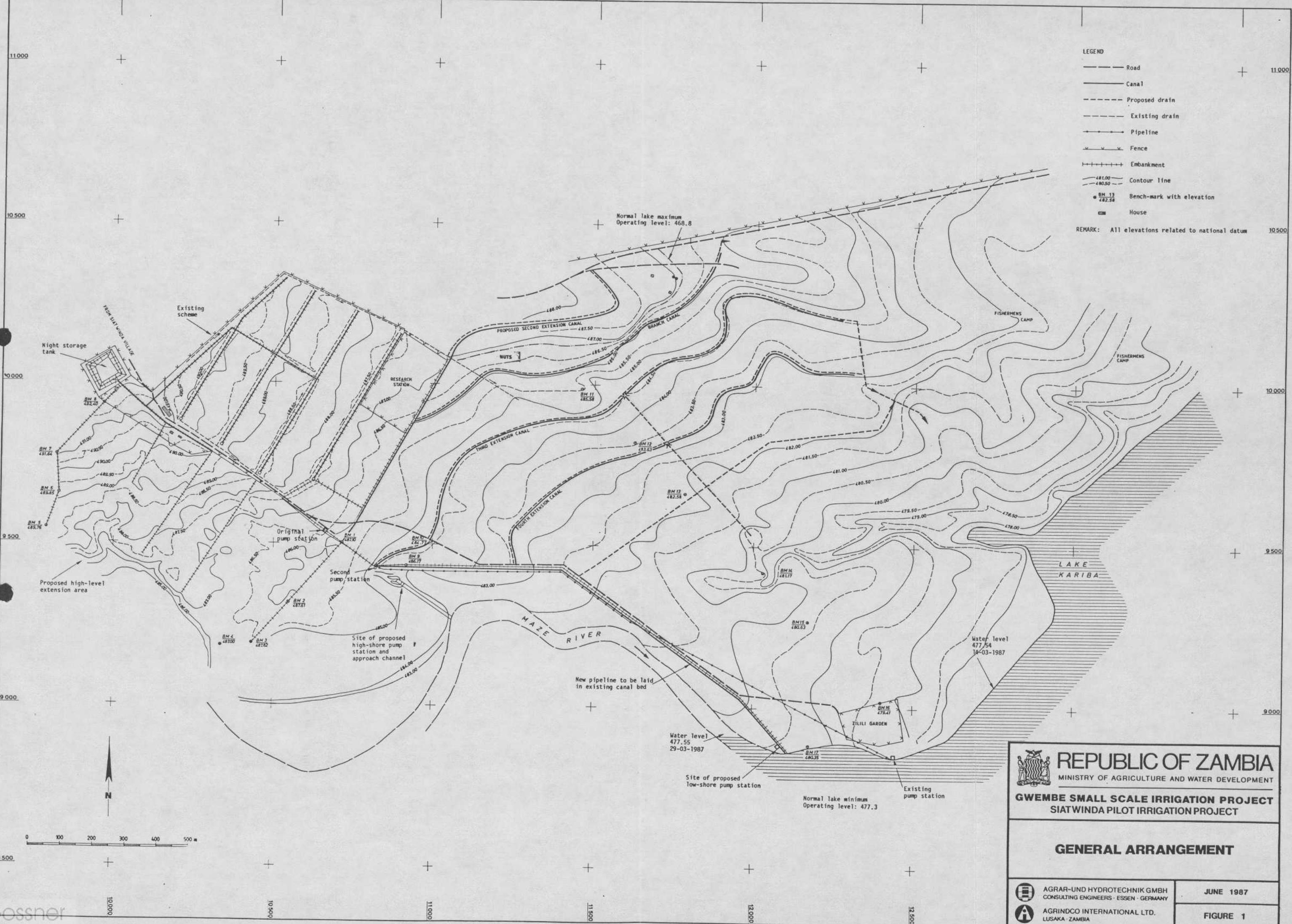
Grain and legume crops will be easy to sell at acceptable prices since the country is importing rice and beans. For vegetable oil which is the final product of soybeans there is a supply deficit. The marketing of the increased quantities of vegetables will require special efforts. The main markets for these will be in the major towns along the railway line as far as Lusaka and Livingstone. Vegetables in the Project will have to be planted to enter the markets at low-supply periods. Then also good prices will be obtained. The continued assistance from the Gossner Team will be important for assuring proper marketing efforts.

With the Project, total farm income and farm income per family labour is expected to double for farmers without irrigation land at present, given 0.2 ha with Project. Farm families with little irrigation land at present but with more irrigation land with Project will at least have a higher income by about 50 per cent. Depending on the extent of irrigation land which a family will be allocated, income may increase even more. Assuming that income without Project just reaches subsistence levels the incremental income with Project would then more or less be available for purchase of other needed goods and services.

With the Project farmers will be able to pay the costs of water supply to their fields. Costs of supplying water comprise reinvestments, maintenance, operation, and of personnel for administration of the scheme. A water fee of K 2,000/ha and year is proposed which is K 850 higher than the charge presently established which does, however, cover only half of the present costs. At the proposed water fee the scheme would break even in Year 13 of project development and would accumulate a surplus of K 250,000 up to Year 25. Financial support of the scheme will need to be continued up to Year 12.

Total project costs for implementation of Stage I (Years 1-5) are estimated at K 21.6 million (DM 4.8 million) in 1987 prices including physical contingencies. Adding financial contingencies for inflation the costs will increase to K 31.7 million (DM 5.2 million). For Stage II (Years 6-10) the costs have been estimated at K 13.6 million (DM 3.0 million) in 1987 prices. No inflation is added.

Benefits of the Project will be derived from increased agricultural production. The overall Project of 150 ha will have an economic internal rate of return (EIRR) of 13.0 %, excluding the costs of electrification. Considering that parts of the lower areas will be subject to flooding by the Lake, the EIRR will be 11.2 %. The Project is more sensitive to reductions in production output and prices and less to increases in costs of implementation and to a delay in implementation. If only Stage I of the overall Project were implemented the EIRR would be 8.1 %. With all the costs of electrification included the EIRR would be 6.1 %.



REPUBLIC OF ZAMBIA

GWEMBE SMALL SCALE IRRIGATION PROJECT

GENERAL ARRANGEMENT



AGRAR-UND HYDROTECHNIK GMBH
CONSULTING ENGINEERS - ESSEN - GERMANY

JUNE 1987

FIGURE 1

Z A M B I A

Gwembe Small-Scale Irrigation Project

Rehabilitation and Extension of Siatwinda Pilot Irrigation Scheme

Feasibility Study

1. Introduction

The Gwembe Small-Scale Irrigation Project comprises two phases. The first phase was concerned with a study into the potential of irrigation development in southern parts of the Gwembe District. The corresponding report entitled Development Strategy Report was submitted in February 1985. The second phase commenced in February 1987 and comprises the feasibility study into and detailed design for the rehabilitation and extension of the Siatwinda Irrigation Scheme. This scheme is one of the projects identified during the first phase for development.

The feasibility study comprises within the existing Siatwinda Scheme

- the rehabilitation of the existing irrigation and drainage system including water conveyance system from Lake Kariba (approximately 30 ha)
- the extension of the scheme into land already allocated (approximately 30 ha)
- further extension by approximately 90 ha of new land arriving at a total of 150 ha
- installation of a power transmission line to serve the pumps.

Detailed designs are to be prepared for the implementation of the 30 ha rehabilitation and the first 30 ha extension arriving at a total of 60 ha.

The present report covers the feasibility study. The study is based on the report for the first phase. Detailed additional surveys were carried out on topography, soils, social aspects, farming pattern, agricultural production, marketing, credit, input supply, irrigation engineering, electrical engineering, organization and management.

Field work for the surveys was carried out from the end of February to the middle of April 1987. Preliminary project proposals were presented to the Government and the financing agency, Kreditanstalt für Wiederaufbau (KfW), at the end of the field work.

Final and detailed project proposals and the economic analysis of the Project were prepared in the Consultants' head office in Germany together with the writing of the report.

The feasibility report is presented in:

- Volume 1: Main Report
- Volume 2: ANNEXES
- Volume 3: Drawings.

2. General Background of the Country

2.1 Current Economic Situation

Zambia is experiencing an economic decline since the mid 1970s when copper prices, its major export good and main foreign currency earning resource, collapsed. This has been further aggravated by a depressed world demand for copper a reduction of production in the mining sector and increased production costs. By the early 1980s Zambia's external resources had deteriorated to such an extent that it could no more service its external debt obligations. Production declined due to the foreign exchange and domestic resources constraints. By 1982 real GNP per capita was 20 per cent lower than in 1974. At the same time Zambias population continued to grow at a rate of 3.1 per cent.

The Government introduced in 1983 fundamental reforms in its economic management and policies comprising a decontrol of prices except for maize meal and for fertilizers, incentives for greater production and diversification of its economy and strengthening of the Government's capacity for economic management.

The control of the foreign exchange rate was replaced by introducing a weekly foreign exchange auction in October 1985. This resulted in a sharp depreciation of the Kwacha from K 2.4 immediately prior to the auction to about K 6.3 in 1986 and to K 18 per Dollar in April 1987.

Inflation in Zambia has been high. For consumer prices the following rates are given: about 19 per cent for 1983, 20 per cent for 1984, 36 per cent for 1985 and over 60 per cent during 1986 as compared with an average of about 12 per cent during 1979 - 1982. The price increase in investment goods has even been higher. In 1985 it rose to 43 per cent and appears to have accelerated to over 120 per cent during 1986.

The employment situation has worsened with the economic decline in the country, and the labour force in recent years has increased.

The reform programme by the Government has not yet been successful in reversing the decline of the economy. Agricultural growth has been strong since 1983, particularly in 1985. Overall GDP showed an upward trend, although slightly only, in 1985 after years of continuous decline.

The decline in the mining industry has led to a drop in its share in GDP from over 40 per cent in 1965 to about 15 per cent in 1985. The manufacturing sector and the services sector which have performed relatively better have increased their shares from 13 to 25 per cent and from 33 to 45 per cent respectively over the same period. Agriculture, has remained of lesser importance with its contribution to GDP of between 14 and 16 per cent over this period. The agricultural sector, however, with its large resources used only little during the past, offers a great potential for employment, income, and export growth.

At the beginning of May, after completion of field work for this study, the Government changed its economic policies by returning to fixed exchange rates which may be followed by price controls and other economic measures.

2.2 The Agricultural Sector

After periods of little growth in agricultural output, production increased more noticeably in 1984, 1985 and 1986. The increase in production can mainly be attributed to favourable weather and better producer prices.

The growth in agricultural production since independence has, however, mainly occurred in the large-scale farming sector oriented towards commercial production. The traditional agricultural sector has remained virtually stagnant over this period. During recent years, however, this pattern changed slightly. Commercial farmers depending on imported machinery and materials were suffering from foreign exchange shortages and since October 1985 from high costs of foreign exchange. Production in the traditional farming sector not depending on foreign exchange, with more favourable weather conditions and more satisfactory producer prices has, however, been increasing. A growing number of small-holder farmers has even become market-oriented ("emergent farmers").

Despite the recent increase in production, development of agriculture still remains below potential in Zambia. Only 20 per cent of its arable land is currently cultivated. Climatic conditions are in general favourable for the cultivation of a wide range of crops.

The slow expansion of agriculture is mainly attributed to inappropriate policies and institutional structures. Heavy public intervention in production and marketing have had a negative impact on agricultural production. State production schemes showed only little success. Marketing of produce and distribution of inputs was in the hands of parastatals and cooperatives. Prices were controlled and fixed at the same level throughout the country. Agricultural staffing has been unsufficient and with only little means to do their work.

In order to fight the general economic crisis, in 1983 the Government in the new 'policy and strategy move' emphasized the development of agricultural production aiming at a diversification of the economy. The objective of this policy was to:

- fully supply the domestic market with major staple crops
- increase import substitution
- expand production of exportable products
- provide greater employment and income earning opportunities to the rural population.

The strategy adapted for the development of the agricultural sector is primarily directed towards improving smallholder farming. Smallholder farming comprises more than half of Zambia's population and cultivates about 30 per cent of the currently cultivated land. An increase in the productivity of smallholders would directly improve the income situation of the rural population and also improve food supply to the urban areas, increase demand for the urban sector products, and slow down migration into the cities.

The policy reforms which have been introduced since 1983 are still far from being completed. The initial efforts, however, seem to be having a favourable impact on the agricultural sector already, besides other factors. The goal of increasing self-sufficiency in basic food crops has almost been achieved whilst the increase of exports of agricultural products, the increase of the income and improvement of the living conditions of the rural population, and the lowering of migration from rural to urban areas are still far from being satisfactory.

2.3 Income Distribution and Poverty

Great income disparities are reported between the rural and urban sectors and between the poorest and the richest within the two sectors. Average annual household incomes in the urban areas are said to be four times as large as those in rural areas. About 60 per cent of all households in Zambia are poor or very poor and of these 80 per cent are located in the rural areas. Four out of five households in the rural areas earn less than necessary to satisfy a minimum level of basic needs. About 30 per cent only of the urban households are considered to be poor with incomes smaller than necessary to satisfy basic needs. General services, too, are much better in the urban areas, although not really satisfactory.

The differences in living standards for urban and rural populations, besides other factors, have partly been brought about by low producer prices set by the Government in favour of the mainly urban consumers. This, however, is being corrected partly by the new policy reforms, like the decontrol and increase of producer prices and the reduction of the consumer subsidy on maize meal, and cutting down of public expenditures on social services.

2.4 Development and Social Objectives

Against the background of a rather unstable economy and an unfavourable social atmosphere the Government of the Republic of Zambia has laid down its main development and social objectives as follows (1):

- to improve agricultural production
- to deal with unemployment and redundancies by creating alternative employment opportunities especially in agriculture
- to arrest the decline in the standard of living of the people through measures which will stabilize the consumer-price levels and reduce domestic inflation
- to improve the production of non-traditional export products.

1) ZAMBIA, Republic of, National Commission for Development Planning: Economic Review 1986 and Annual Plan 1987. Lusaka January 1987, p. 46.

In the context of these objectives agricultural development is given high importance with the following objectives (2):

- to achieve a satisfactory level of self-sufficiency in the production of staple foods
- to expand the production of agricultural exports
- to increase the import substitution of agricultural products or inputs
- to improve rural employment and income.

Projects in the agricultural sector will have to be designed to satisfy these objectives. This refers also to the Siatwinda Pilot Irrigation Scheme which will be evaluated against these objectives.

1) ZAMBIA, Republic of, National Commission for Development Planning: op.cit., p. 114.

3. Project Rationale

The people in the Gwembe Valley are considered in Zambia as one of the poorest. The area is somewhat remote. The internal physical infrastructure is rather poor. Communication with other parts of the country is difficult. Climatic conditions are unfavourable with low rainfall and even drought years resulting in crop failures and famine. Fertility of soils is mostly low. Supply with goods and services of the area is minimal. The income situation of the resident population, which is almost entirely based on subsistence agricultural production, does not allow for an improvement of living conditions. Nutritional and health conditions of the population are rather poor.

In addition part of the people in the valley have been suffering from resettlement as a consequence of the construction of the Kariba Dam and creation of the Lake in 1958. In their traditional environment along the Zambezi River two crops were possible: one in the rainy season and one in the dry season on the banks of the Zambezi and its tributaries following the receding floods. In the new environment along the shores of the Lake the people felt at a loss initially and adjusted only gradually to the new situation. Resentment still exists with them for having to suffer from the Dam and Lake without any benefits for themselves.

Another unpleasant event to the people in the Gwembe Valley was the independence war in Rhodesia. With the border between the two countries passing through the Lake, fighting was even carried into the Gwembe District. Life for the people became more insecure, the little physical infrastructure was partly destroyed and supply of the area with basic goods and services came to a complete stop.

An increase in the population caused an additional strain on the poor resources and worsened living conditions further.

The Government with its strained resources found it difficult to help the people improve their living conditions, and in this situation the people grew frustrated and discontent with the Government.

All the above constraints are still resulting in very poor living conditions, an income situation which only in years with sufficient rains allows the people to support themselves, poor nutritional and health conditions, and emigration of the mainly younger and ambitious people to the urban areas for jobs.

Against this background attempts have been undertaken by the Government together with foreign cooperation to develop safe and additional sources of agricultural income through the introduction of irrigation. The study of the first phase identified possibilities for irrigated agriculture. One of these is the rehabilitation and extension of the Siatwinda Irrigation Scheme on the shores of the Kariba Lake where water is pumped from the Lake to the fields.

The Siatwinda Irrigation Scheme was constructed in 1970/71 by the Government and the farmers in cooperation with the Gossner Mission of West Berlin. Irrigation technology was new to the farmers but farmers gradually took on to it. After 1981 pumping of irrigation water became increasingly difficult due to receding of the lake level, pump breakdown, and other constraints with even a complete collapse of the scheme for two years. Only in the 1985/86 season were operations resumed with pumping over a distance of about 2 km but only on a limited area of the total 30 ha originally put under irrigation.

Having put efforts into preparing their irrigation fields (which yielded little or nothing due to irrigation water constraints) the farmers have suffered from losses in income. This situation may happen again if facilities are not put into proper condition and operated and maintained adequately. In addition improved facilities would even allow for the supply of the total of the original scheme.

In addition further land adjacent to the present scheme and suitable for irrigation could be reclaimed for irrigated agriculture. This would allow more farmers to participate and to gain an additional and safe income.

4. The Project Area

4.1. Physical Features

4.1.1 Geographical Location and Access

The Project Area (Map 1) covers the present Siatwinda Irrigation Scheme and adjacent areas. It is located in Gwembe South Sub-District of Gwembe District, being part of the Southern Province. The geographic position is 17°26' southern latitude and 27°19' eastern longitude. The Siatwinda Scheme borders the Lake Kariba at its highest level. Half the present Project Area lies below this highest water level, which, however, has not been reached since 1980.

The area can be reached from Lusaka by tarmac road of some 330 km, by gravel road of 15 km, and by unsurfaced road of 5 km. The nearest town is Maamba (about 25 km). The next administrative centre (Sub-District) is Sinazongwe (about 60 km). The district capital of Gwembe, the town of Gwembe is difficult to reach, only through the Districts of Choma and Monze. Choma with the provincial agricultural administration is about 130 km from the Project Area.

There is no regular transport service to Siatwinda. Only Maamba has daily bus service to Lusaka. Transport from and to the Project Area is by private vehicle or by lift.

4.1.2 Climate and Water Resources

The climate of Gwembe South is characterized by one distinct rainy season lasting from November to April, with the main precipitation occurring in the period from December to March. While the variability of the monthly mean values of other climatic factors is rather limited, rainfall is subject to strong interannual and intermonthly fluctuations, thus rendering it the most critical component of the climate. Although the mean season rainfall total is roughly 1,000 mm, the 80 per cent reliable total is less than 700 mm, and the corresponding monthly figures, on which irrigation capacity is based, are some 40 per cent less again.

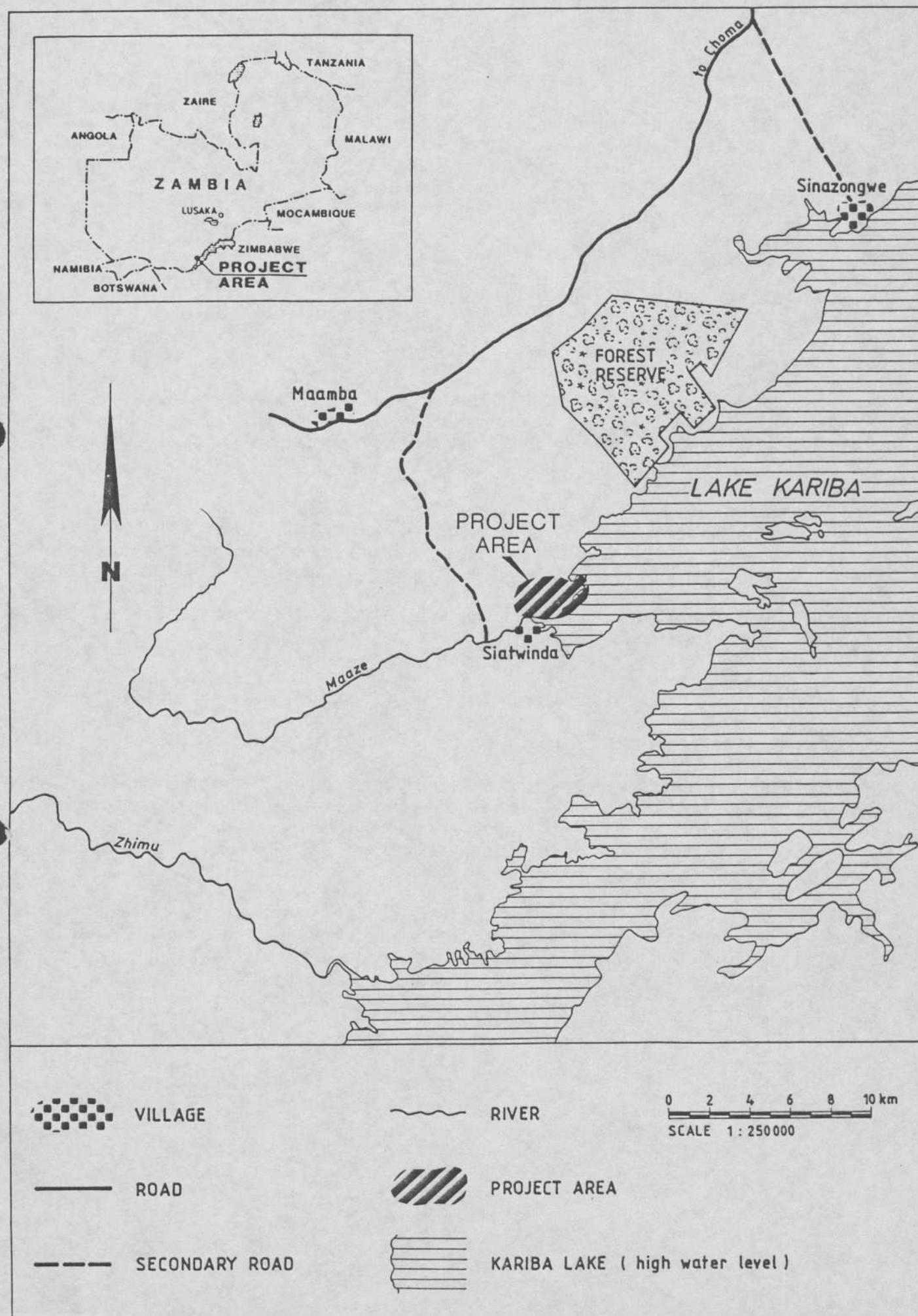
Generally the climate can be classified as hot with tendencies of semi-aridity, since the potential evaporation exceeds by more than twofold the expected rainfall (2,200 - 2,500 mm).

The mean annual temperature is about 25°C with extremes of 44°C and 0°C. Due to the high temperatures the relative humidity is rather low (55 per cent annual mean). Mean wind velocities are moderate 3 - 7 km/h, with some strong gusts occurring; easterly, south-easterly winds prevail.

The sunshine duration is high (over 3,000 hours per year can be expected). Shortwave solar radiation (roughly 540 Langley's per month) indicates considerable energy potential.

MAP 1

LOCATION OF PROJECT AREA



The Maaze River, bordering the Siatwinda Project Area, carries spate flows in the wet season and cannot be used as a regular source of irrigation water. The only reliable source is Lake Kariba, which suffers from unpredictable fluctuations in level and location of its shore line.

4.1.3 Soils and Topography

In the existing scheme old alluvial soils prevail. The physical properties of these soils are unfavourable but can be improved by cultivation and fertilization with animal manure. The most suitable crop for these soils is rice under irrigation.

The first extension area has three types of soils. Soils moderately suitable for irrigation with good physical properties, soils marginally suitable for irrigation because of their light topsoil texture and with low fertility, and thirdly soils similar to those in the existing scheme.

The topography of this first extension area has some disadvantages. For irrigation cultivation levelling is required which may cause some textural (subsoil) and fertility problems. This may, however, be avoided by removing the topsoil and replacing it after levelling and by adding fertilizer.

Although cleared once already, clearing of the first extension area needs to be done again since a vegetation of mainly Acacia bush has reestablished itself.

Extension beyond this first extension area is not feasible as one reaches the lower terraces of the Maaze River. Topographical limitations and flooding hazards render this area unsuitable for irrigation.

North of the present scheme, soils are sandy and unsuitable for irrigation. Settlements border the scheme to the west where the topography becomes somewhat sloping. Beyond the villages parts of the area were classified in the first phase study as suitable for irrigation. The long pumping distance makes these areas, however, unsuitable for irrigation.

The most suitable area for a further extension of the scheme is in the drawdown zone of the Lake. Soils of this area have varying properties and are suitable for irrigation. At present maize is grown in parts during the wet season; other parts are covered by grassland and smaller sections by bush. The topography of this area is rather favourable.

Details of the Project Area soil survey are presented in ANNEX 1 in Volume 2 of this report.

4.2 Economic Base

4.2.1 Land Use and Farming Systems

The land in the Project Area can be divided into four ecological sub-zones according to its uses. These are:

- Non-arable hilly and/or woody land: This is used for grazing of cattle during the wet season when fresh grass grows and for goat feeding throughout the year.
- Arable upland: This lies between the non-arable hilly or woody land and land of the lake drawdown and the flood land of the Maaze River. Fields are prepared by first cutting trees which are later burnt before land is prepared for cropping of subsistence crops - maize and sorghum/millet.
- Flood land along the Maaze River: This is fertile land due to deposits of alluvial layers during flood periods. The upper part of this land is cropped during the rainy season, while the lower part is cropped in the dry season, especially areas with sufficient residual moisture for crop growth without irrigation.
- The Lake drawdown land: This is a fertile area and is used for rainfed cropping as well as dry season crop production where there is sufficient residual moisture.

The farming patterns have evolved from the types of land available for arable agriculture. In the upland, fields (ntemwa) are prepared for production of maize, mainly local varieties, and sorghum/millet for subsistence purposes. Intercropping of minor crops - which mature earlier than maize or sorghum and millet for early relief from famine - is practiced. When cotton or sunflower is grown it is planted mainly in the upland fields. Normally each farm family puts some land under fallow each year to restore soil fertility.

On the fertile flood land of the Maaze River, maize and sorghum are the main crops in the rainy season. Yields are better than in the upland fields, but land available is inadequate to accommodate many farm families. During the dry season, the gardens, called Zilili, produce green maize, vegetables and popular cucurbit types. The Zilili gardens are a source of food and cash during the period May - November. The most important basic principle of Zilili farming is that sufficient residual moisture is available in the soil for crops to reach maturity with or without minimal supplementary irrigation.

In the lake drawdown area, the upper part is used for rainfed cropping of improved maize varieties. Soils are much more fertile than on the fields in the upland and therefore yields are substantially higher. In the lower part of the drawdown area nearer to the lake shore, Zilili farming is tried on an experimental basis on a small area for production of green maize, vegetables and cucurbits. As on the flood areas of the Maaze River, only a few farm families can have land in this area.

Most farmers cultivate in the various ecological sub-zones - although often only small fields. Few farmers (75) cultivate 0.1 - 0.2 ha of irrigation land on the present scheme in the upland. Women mostly crop separately from their husbands although some work is shared. Two wives of the same husband in general crop separately for and with the help of their own children. There is usually no cooperation between the two wives. Total area cultivated by the family of one man with one, two or even more wives in the Project Area may vary between less than 2 ha and more than 5 ha. One holding of 20 ha was even reported. Farm sizes are mostly related to the number of family labour. Paid labour is used very little. Mutual assistance is exchanged for food and beer. Livestock is kept by almost all families, rather extensively, and grazed on communal grounds.

4.2.2 Agricultural Production

Rainfed agriculture is practiced on fields in the drawdown zone of the Kariba Lake, on the banks of the Maaze River and on fields scattered in the bushes around the villages. Rainfed cultivation allows only one crop per year in the rainy season.

The people in the Siatwinda Area are basically subsistence farmers with rainfed agriculture. The production of staple foods (sorghum, bulrush millet and local maize) does not enable farmers to meet their entire food and other needs. Therefore they have to supplement their incomes from sources outside the subsistence crop production. Part of this income is derived from the extensive livestock production. The other part has to come from the production of cash crops. Sunflowers and cotton were tried to be grown by some farmers besides improved maize as cash crops. It was experienced that during frequent very dry years mainly sunflower and cotton did not yield safely; also the more drought-resistant crops, sorghum and millet, did not yield enough to support the population.

Agricultural practices are still rather traditional. Land preparation by ox plough is done only by part of the farmers; the others are using hand hoes. Seeds are mostly taken from the previous own crop having no potential for higher yields. Fertilizers and pest-control chemicals are hardly used for lack of buying capacity and danger of loss in case of crop failure as a result of little rains only. Little is done for crop maintenance, and the yields are consequently very low.

Irrigated agriculture is practiced at Siatwinda on the irrigation scheme constructed in 1970/71. The original total area of 30 ha was divided into plots of 0.2 ha. Of this, 22 ha were given to about 75 farmers and 4 ha for research and trials. Most farm families were cultivating one plot of 0.2 ha. Some larger families were given more than one plot.

The irrigation scheme in the past suffered from constraints in water supply due to the receding of the Lake and to breakdown of pumps with even a complete collapse. In the 1985/86 season irrigation was resumed again on an area of 12 ha only. The plots were subdivided into 0.1 ha units to accommodate all farmers.

With sufficient water pumped from the Lake, two cropping seasons are possible allowing an income twice a year from a piece of land. Main crops grown are rice in the wet season from November to April and a variety of vegetables in the dry season from May to September. The irrigation crops were planned mainly for sales to the markets and to a lesser extent for own consumption.

Farmers in the irrigation scheme try to follow advice and recommendations from the extension staff. Nevertheless, part of the land is still prepared by hand hoe for lack of more oxen and ploughs. Improved seeds of rice and vegetables are bought with the potential for higher yields. Quantities of seeds and spacing of seedlings are still not optimal, as are the use of fertilizers and also of plant-protection chemicals. Application of irrigation water is not satisfactory as far as quantities and timing are concerned.

Despite the above-mentioned deficiencies, when the scheme was in operation yields on the irrigation land showed acceptable results and allowed farmers an additional income besides that from their rainfed cultivation.

Livestock, although kept rather extensively, is quite important for the population. Cattle are kept for draught power, for milk and meat, for ceremonial purposes and most important as a saving for difficult times, e.g. years of crop failures. Goats, second in importance, are kept as a source of meat and cash income. The main constraints in animal husbandry result from poor animal health conditions.

More details on agricultural and livestock production are given in Chapter 2 of ANNEX 3 in Volume 2 of this report.

4.2.3 Irrigation

The only irrigation carried on in the Project Area is that of the Siatwinda Scheme itself. The scheme has been laid out to irrigate an area of about 30 ha. It was served originally by a pump station on the high shore of the Lake, which supplied water through a 150 mm PVC pipeline to four outlet boxes, controlled by individual sluice valves, and to a night storage reservoir of about 10,000 m³ capacity. The area was split vertically so that one part could be served by a separate gravity system from the night storage tank and the other directly from the pumping main.

As the Lake receded the site of the pumping station was shifted twice, and is now at a temporary location some 1.7 km from the high shore line. The connection has been made in the same 150 mm diameter pipes, with a consequent increase in operating head to about 60 m, because of pipe friction. There are three mobile diesel centrifugal pump sets, one Lister and two Deutz. One Deutz set was damaged and is being replaced. Under present conditions the Lister can deliver about 30 l/s, and the Deutz 20 l/s. If the two Deutz were operated in series they also could deliver 30 l/s. There is therefore enough pumping capacity to irrigate the full existing scheme if the night-storage tank were brought back into service.

4.2.4 Input Supply and Product Marketing

The following organizations are involved in the distribution of agricultural inputs: National Agricultural Marketing Board (NAMBoard), Southern Province Cooperative Marketing Union (SPCMU), Zambia Seed Company (ZAMSEED), Lint Company of Zambia (LINTCO), and private chemical companies.

In the past no improved seeds were available in reach of the farmers. Since only small quantities were involved, Gossner Service Team members stationed at the scheme mostly brought seeds from trips to Lusaka.

Fertilizers are supplied by the Southern Province Cooperative Marketing Union (SPCMU) at Choma (130 km from the Project Area) to a store rented from the irrigation scheme. Fertilizers were not short in supply as can be assumed from the stocks which were in the store for some seasons already. This may, however, be attributed to the little application only of fertilizers by the farmers. With development of the scheme bottlenecks may, however, arise.

Agro-chemicals are mostly imported and distributed by chemical companies, to a lesser extent by NAMBoard. None of these, however, has yet supplied chemicals to the Project Area most likely due to the small quantities demanded. Farmers with the help of the Gossner team brought chemicals from Choma and Lusaka. With an increased demand for chemicals arrangements for a safe supply will have to be made.

LINTCO who are responsible for provision of inputs for cotton production have rented some store space from the irrigation scheme. Some chemicals they supply are also applied to vegetables and the sprayers which they sell are also used for spraying of irrigated fields.

Farmers in the Project Area are free to sell their product to any customer. SPCMU acts as official buyer of last resort of all major crops. Private traders as far as the Project is concerned play a major role in the marketing of beans and vegetables.

In the Project Area the SPCMU at the store rented from the scheme buys crops from area farmers. Products bought from farmers were maize and sunflower. The largest quantities were bought in 1986: 33 t and 67 t respectively. Produce of the existing irrigation scheme was not sold to SPCMU in recent years. The small quantities produced were sold directly to customers. The transport capacity of the SPCMU at Choma is limited, and most of the produce is therefore transported by hired private trucks.

Vegetable sales were in the past made to ZAMHORT, a parastatal marketing organization and directly to private traders and customers. ZAMHORT, for various reasons stopped buying vegetables. Farmers organize themselves and join in the hiring of transport of the vegetables or bring it individually by lift to the point of sales (Maamba, Choma). Private traders when knowing about marketable products at the scheme sometimes come by lift, buy some bags of vegetables and leave again by lift for Maamba or Choma. Seldom do traders come with their own transport, even from Lusaka. The traders resell the vegetables to market women in Maamba, but mostly in Choma; some were sold in Lusaka.

Sales of vegetables when the scheme was more or less in full production have been a problem. Transport was not sufficiently available and the large quantities supplied were difficult to sell. Often the vegetables were also brought to the markets when there was plenty already. Prices obtained were, therefore, low.

4.2.5 Other Economic Activities

Non-agricultural economic activities do not play a major role in the Project Area. Along the shores of Lake Kariba there are some fisher camps and professional fishing, especially Kapenta fishing is being carried out. Catches are mainly sold to businessmen from Lusaka who come to buy the produce. The fishermen, however, are mostly not Gwembe people, but come from Northern and Luapula Provinces on a semi-permanent basis.

The Maaze Consumers Cooperative Society emerged from Siatwinda Credit Union and was started some five years ago. Its main objective is to economically utilize the money of the Credit Union and provide essential commodities to members and non-members in the area. Although still a young organization, in 1986 the turnover had already reached approximately K 300,000. Main activities are the operation of a hammer mill and a consumer shop, and future plans aim at the construction of a rest house including a restaurant to meet the already existing demand by the fish traders.

Farmers' economic activities apart from agriculture are of little importance. Although in 30 per cent of all households somebody carries out such activities, they are usually only seasonal and the contribution to the household income is not of great significance. Fishing again is predominant (see ANNEX 2, Chapter 3.2, Volume 2), either self-employed or employed by professional fishermen.

For women beer brewing and distilling alcohol are a major source of cash income. Especially the local brew from millet (gankata) enjoys great popularity throughout the year. Local bars for commercially brewed beer are relatively numerous, but greatly depend on the very erratic supply.

4.3 Social Aspects

4.3.1 Land Tenure and Size of Holdings

All land in Zambia is vested absolutely in the President who holds it in perpetuity for and on behalf of the people of Zambia. In the reserves and trust lands, however, the powers of the President are limited by the requirement to consult the local authorities like the Chief and the District Council in making grants or dispositions of land. In practice, the traditional land tenure system still prevails.

The basis of land holding in the Project Area is the right which each man has over the land which he has cleared. Arable land is owned individually as long as it has been under cultivation within living memory. Lineages obtain rights to land only through the clearing activities of their members. The individual cultivators, however, do not have the right to give lineage land to somebody who is not a member of the lineage. Individually cleared land can be given to a wife or the children who are then likely to gain full rights over it. Lineage land, however, received from a spouse has to be returned to lineage at death or at divorce, even if the wife does not have any other fields to make a living on. This quite often leads to an economically very desolate condition of female-headed households.

Besides individual and lineage ownership, public ownership exists in the sense that no one can question a person's right of access. Land which has not been previously cultivated is public domain and principally free to anybody who wants to clear the bush and transform it into fields.

In addition to this public ownership there is some communal land at the Chief's disposal which can be given to anybody who wants to cultivate it but reclaimed, if it is needed for other purposes. This given land, thus, does not create the right of ownership. Cultivation of communal land, however, does not play a significant role in the Project Area.

The size of holdings in the Project Area varies considerably. The overall range is from 0.5 ha to 20 ha, whereby farms of more than 10 ha are real exceptions. Also notable differences can be found between the various villages, average farm sizes vary between 3 and 6 ha. Holdings of villages close to the Lake tend to be bigger than those of the more remote villages. Village averages of the former ones are all above 5 ha, while the latter ones are all below that mark.

Of interest for the determination of typical model farms is the distribution of farm sizes. A heavy concentration of farms can be found around the 3 ha size bracket, especially in the villages not yet participating in irrigation, while the second largest concentration is being observed around the 5 ha size bracket, more frequently found in villages already participating in the scheme.

A farm survey was carried out during the course of the study the results of which are put down in ANNEX 2, Volume 2.

4.3.2 Population and Migration

The overall district population was census in 1980 to be 94,000 people, of whom 44,000 live in Gwembe South Subdistrict. Between 1969 and 1980 the district population grew annually by 2.2 per cent, which is far below the growth rate of the entire nation of 3.1 per cent. But census figures are believed to be too low, because at the time of the census some areas were still mined from the liberation war and enumerators did not enter them. Thus, the actual population growth rate is likely to be higher. Projections, even with 2.2 per cent, indicate an overall population in Gwembe South of approximately 52,000 people in 1987.

The 10 villages making up the Project Area are all located in Mweemba Ward of Senior Chief Mweemba. The total number of farm households of these villages approximates 450 with an average household size of 9. 10 per cent of all households are female headed. Among the male-headed households, 40 per cent are still polygynous, 28 per cent having two and 12 per cent more than two wives (see ANNEX 2, Volume 2).

The labour force per household, i.e. the number of people who are able to do farm work, averages 5. This includes all children over 15 years living with their family and all adults up to the age of 50. The division line between people in working age and those belonging to the old-age group was set at 50 years due to the extremely harsh living and working conditions in Gwembe Valley.

Reliable data on migration are not available, either for Gwembe District as a whole or for the Project Area. Due to the information obtained from the socio-economic survey, in 37 per cent of all households one or more members left the area for jobs outside the Valley. On average, one person per household has migrated for one reason or the other; this means that by stopping migration the actual labour force could be increased by 20 per cent.

Although emigration from the Project Area is not alarming at all and contribution to the family income is minimal, it cannot be regarded as a transitory or seasonal phenomenon, but should be rather considered for planning development activites.

4.3.3 Social Services

The Gwembe Valley is known as one of the least developed regions in Zambia and thus, it is not surprising that the network of social services within the Project Area is far from being sufficient.

The school system, mainly a heritage from colonial times when all schools were under the British Methodists, is quite good, at least in terms of number of schools. 5 primary schools are in or close to the Project Area, of which 4 go up to grade 7. Kanchindu primary school is even under consideration of being extended to a secondary school. At present, the next secondary school, established in 1986, is in Maamba, but for boys only. Girls have to go as far as Choma some 130 km away.

The health care situation in the Project Area is very poor. There is one clinic in Kanchindu which seems to be sufficiently staffed but very poorly equipped. At the time of the study, the only drug available was chinin for malaria treatment. Not even aspirin was on stock. The next hospitals are in Maamba and Choma, but no transport can be provided, thus for the common man and in urgent cases access to these hospitals is of theoretical nature.

A major problem in the whole area is the drinking water supply. Although people reportedly prefer "natural" running water from rivers and springs and seem to be reluctant to take it from wells, the daily long queues at the well in Kanchindu seem to disprove this or indicate at least that attitudes have changed a bit. As a preventive measurement to improve the health of the people in the Project Area activities regarding drinking water supply are urgently required.

Community development activities have been introduced by Gossner Mission under the Gwembe South Development Project. To mention a few, womens' clubs and village selfhelp promotion are the most important ones. Womens' clubs are concerned about nutrition and preventive medicine and also aim at home production activities; of late they have introduced their own oil mills in two villages of the Project Area. In addition to various production activities like rural crafts the village selfhelp promotion deals with loan provision, among others for educational purposes, school uniforms and so on.

4.4 Institutions

The Ministry of Agriculture and Water Development (MAWD) is responsible for agricultural policy, strategy and services. It is subdivided into four Departments: Agriculture, Veterinary and Tsetse Control Service, Fisheries and Water Affairs. The Department of Agriculture has three branches: Extension, Land Use and Research. At the provincial level the Department is headed by the Provincial Agricultural Officer (PAO) who is supported by subject matter specialists. The provincial headquarter is at Choma.

In Gwembe District the District Agricultural Officer (DAO) is responsible for the coordination of agricultural activities. For ease of implementing extension service programmes the District is divided into 5 Agricultural Blocks. The Project Area is in Mweemba Block which comprises 7 Agricultural Camps. Two Camps - Kanchindu and Muchekwa - make up the Project recruitment area. Camps are run by Camp Supervisors who are the grassroot extension workers. One of the main constraints of the extension service is lack of transport resulting in poor coverage of farmers by the extensionists.

Farmer training is done at the Malima Farmer Training Centre in Gwembe South which is equipped for residential courses as well as day courses. The training capacity of the centre is 24 farmers per course. Mobile courses are also conducted, but due to lack of funds (fuel) the number is very limited.

Agricultural research comes under the responsibility of the Research Branch of the Department of Agriculture. In each province there is a Regional Research Station. At Siatwinda within the irrigation scheme a substation of 4 ha has been introduced, on which research work is conducted, mostly in the rainy season.

The Department of Veterinary and Tsetse Control Services at the MAWD is responsible for animal-disease control and research. Gwembe South Subdistrict has a Livestock Officer at Sinazongwe; the Project Area is served from Kanchindu Veterinary Camp.

The major organization providing credit to farmers in the region is LINTCO for cotton growing. For other purposes AFC is responsible, but has no office in the District, and the lending level has become negligible. Some years ago SPCMU started a seasonal credit scheme, but at present no credit operations are being carried out in the Project Area. The only effective source of credits in the Project Area is the Siatwinda Self-help Savings and Credit Union which was established 10 years ago and meanwhile has 355 members or shareholders.

The Ministry of Cooperatives has the overall responsibility for cooperative development in the country. It is represented in the Southern Province by the Provincial Marketing and Cooperative Office in Choma. Gwembe South Subdistrict has one officer for the promotion of cooperative development. The officer is poorly equipped with transport and other supporting facilities, and thus activities are on a very low level.

In the Project Area in addition to Siatwinda Savings and Credit Union, the Mweemba Multipurpose Cooperative Society and the Maaze Consumers' Cooperative Society also exist. While the Mweemba Cooperative is dormant, the latter one is quite prosperous and still growing.

5. The Project

5.1 Objectives and Description of Project

The objectives of the proposed Project are in line with the Government's development and agricultural-production strategies. The Project aims at increasing income and improving food supply of the target group of small farmers. With a safe crop from irrigation agriculture in addition to their rainfed cropping, farmers would be in a position to better support themselves in years of drought. Besides improving their diet by consuming part of their irrigation crops they will yield additional income placing them in a position to purchase goods and services badly needed, which, without Project are beyond their capabilities for lack of cash. With their increased purchasing capability the rural population would buy goods manufactured in urban areas thus contributing to the income of the urban population.

The general improvement of living conditions in the Project Area and the creation of additional job opportunities through the rehabilitation and the extension of the existing irrigation scheme at Siatwinda is expected to also counteract emigration to the towns. Directly benefitting from the rehabilitation and first extension of the scheme would be 120 to 150 families. With an extension by a further 90 ha in a second phase the total number of families benefitting could be more than 300.

The Project will include:

- Rehabilitation of the existing irrigation scheme of 30 ha and extension by 30 ha (Stage I) and a further stage or stages for an additional 90 ha. This will include the supply and installation of pump equipment and delivery of pipes, the construction of intake canals, the rehabilitation of the reservoir and of canals and structures, levelling and construction of canals and structures in the extension areas.
- Installation of a power transmission line from Maamba. This line will be constructed up to the irrigation scheme for providing the irrigation pumps and other small equipment of the scheme with power. The line will be energized initially with 11 kV which can be increased later to 33 kV when demand increases.
- Improvement of the agricultural support services which will include the provision of additional and training of extension staff, research and credit personnel with necessary requisites, provision of short- and medium-term agricultural credit.
- Institutional development which will include provision of administrative staff and additional pump personnel to the farmers' organization, extension of the scheme office, formation of a farmers' cooperative, training of the members of the Farmers' Executive Committee in project management and administration.

- Implementation assistance for tender procedures, for supervision of construction of the Project, for advice in irrigated agricultural production, in marketing of the production of the scheme, in supply of inputs, and in the formation of a farmers' cooperative to operate and manage the scheme.

5.2 Detailed Features

5.2.1 Irrigation Facilities

The irrigation scheme has been designed to function between the normal minimum and maximum operating levels of Lake Kariba, 477.3 m and 486.8 m on the National Datum. Even at full development the pumps can handle a further retreat of the Lake to the extreme minimum of 475.8 m, but the approach channel would need dredging by about 0.8 m in the Maaze River channel at present under water. Flood protection will be provided against normal operating levels, but handling the extreme flood level of 488.5 m, a 1:10,000 year or rarer event, is not justifiable. It would flood three quarters of the existing scheme.

It is proposed to construct two pump stations, essentially providing a suction well and a platform on which to stand movable trailer-mounted electric centrifugal pump sets. The low-shore station will be situated on the Maaze River bank at the present shore line and will supply the scheme through a buried 450 mm asbestos-cement pipeline laid in the bed of the existing, non-functioning, gravity-supply canal. This channel was left dry as the Lake receded even further than anticipated even though its end is 1,700 m from the high-shore line.

The link between the Lake and the high shore pump station is the Maaze River channel which will conduct water by backwater flow to within 400 m of the scheme before the low shore pump station will be flooded. The high shore station will be sited midway between the Maaze channel and the high shore line, the excavation of an approach channel providing fill for an embankment giving permanent access above the normal maximum operating level. The high shore station will have two levels, to split the maximum suction head of 9 m which a single pumping stage would suffer.

The pipeline is routed via the high shore station for a total length of 2,470 m between the low shore station and the night storage tank. The high shore station is 1,140 m from the night storage tank. The pressure main will also supply the irrigation blocks directly through sluice valves and outlet boxes. There will be no separate gravity supply system from the night storage tank, backflow through the main being used in hydraulic balance with the pumped supply.

Rehabilitation of the existing scheme will cover the repair of leaks in the night storage tank and pipeline, overhaul of pump units and the lining of the water courses after connection to the new pipeline.

The high level extension area of 30 ha will be cleared and shaped to adapt it to surface irrigation methods. The water courses will be lined with prefabricated asbestos-cement sections. Future extension areas in the drawdown zone of the Lake will need relatively little land shaping. The watercourse lining can be lifted and relaid as necessary.

Details on the irrigation layout are presented in ANNEX 4, Volume 2.

The general arrangement is shown in Volume 3, Drawing 4-1, reproduced here in reduction as Figure 1.

5.2.2 Electrification

The Siatwinda Irrigation Scheme is approximately 25 km distant from the Maamba Coal Mine (MCM) area where a grid substation 88/33/11 kV, 50 Hz, of Zambia Electricity Supply Corporation Ltd. (ZESCO) is installed to supply the local consumers. Initially it will be possible to have an 11 kV and later on a 33 kV connection for electricity supply to the scheme from this substation. Unfortunately, it is impossible to use a part of the over-head line (OHL) from MCM to Sinazongwe because the power demand at that farm is so high that within 2 years a 66 kV electricity supply will be necessary, and the installation of a 66/33/11 kV transformer substation for the Siatwinda branch would be too expensive. Thus the Siatwinda electrification needs its own OHL insulated for 33 kV but energized at 11 kV for the present.

From Siatwinda village to the irrigation scheme only an 11 kV insulated OHL will be erected, so that a 33/11/0.3 kV substation will have to be installed in Siatwinda village in future when a change in voltage becomes necessary.

Considering the high fluctuations of the lake level (approximately 10 m) and consequently the long distance between low-lake and high-lake shores, it is necessary to have two locations for the pump station. It is possible to shorten the present distance between both stations by an embankment into the upper drawdown region. At the end of this dyke the high-lake transformer substation is to be installed but disconnected by an isolator until needed because of a rise in the lake level. A second transformer substation with equal power output, but pole-mounted above extreme flood level, is to be installed at the low shore, at the location of the movable pump station. Conductors, transformer and switchgear for this line will remain but disconnected when the pump station is shifted and the high lake substation is running. The pump motors are connected via plugs and sockets to the corresponding low-voltage distribution panels at the substation.

A further small transformer substation supplies the storage shed with electricity for radio telephone, rice mill, and other applications.

Detailed proposals for the electrification are presented in ANNEX 5, Volume 2.

5.2.3 On-Farm Development

When the Project is implemented, adequate irrigation water will be available to irrigate all the 30 ha in the present scheme. The 75 farmers who have only a 0.1 ha plot at present will be able to increase their irrigated land again to 0.2 ha. This plot size will be the basis for land allocation on the scheme. A few farmers who are more experienced and with more family labour available may get more than one plot as was the case when the scheme was fully operational. The 0.2 ha plot size is considered adequate for the majority of the farmers due to the labour intensity of irrigated agriculture throughout the year. Irrigated land shall, however, not substitute for rainfed land but rather supplement it for a more safe income.

Double cropping will be practiced on the scheme. Rainy season cropping will be from November to March and dry season cropping from April to October. A cropping intensity of 200 per cent is planned.

Each season will start with land preparation. In order to get all the land prepared on time, it is recommended that all farmers on the scheme own a pair of oxen, an ox-drawn plough and harrow. According to the survey carried out, about 50 per cent of the farmers on the scheme already have oxen. A credit facility through a local institution will be established to enable those farmers without oxen and implements to purchase them.

Crops proposed for production on the existing scheme during the rainy season are rice, soyabean, onions and tomatoes. Crops for the dry season will be beans (dry), potatoes, onions, okra, carrots, cabbage (or other vegetables). The proposed cropping pattern will be:

	Rainy season		Dry season
Rice	75 %	Beans (dry)	55 %
Soyabean	10 %	Potatoes	15 %
Tomatoes	10 %	Cabbage	10 %
Onions	5 %	Onions	10 %
		Okra	5 %
		Carrots	5 %.

The proposed cropping calendar of the various crops for the existing scheme is given in Figure 1 of ANNEX 3, Volume 2. To ensure timely preparation of land, nurseries for different crops will be prepared in small pieces of land which are normally not under crop. In order not to delay land preparation, rice, soyabean and onions will be harvested and dried outside the fields by the beginning of April and October, respectively.

In order to obtain assumed yield levels, shown in Table 23 of ANNEX 3, Volume 2, other production practices including the following will be improved:

- timely land preparation
- timely planting
- effective pest and disease control measures
- good weed control
- optimal application of water
- correct use of inputs, i.e. seeds and fertilizer
- provision of tools.

A crop rotation system will be introduced, aiming mainly at minimizing eelworm infestation and blight, to improve soil fertility by rotating rice and vegetables with two leguminous crops - soya and beans.

In the 30 ha and the 90 ha extensions, only 45 per cent about of the land is suitable for rice. In order to give all farmers an equal opportunity, each farmer will get one plot of 0.1 ha on the rice land and another on the non-rice land.

The crops that will be grown are:

	Rice Land 45 %	Non-rice Land 55 %
Rainy season	Rice 100 %	Soyabbeans 55 % Tomatoes 22 % Onions 23 %
Dry season	Beans (dry) 50-100 % Potatoes 50 %	Beans (dry) 9 - 45 % Potatoes 0 - 45 % Cabbage 18 - 22 % Okra 18 - 22 % Carrots 10 - 11 %.

The proposed cropping pattern for the extension area is set in a three-year rotational cycle for reasons of soil fertility and minimizing plant diseases.

Details for improvement of production under irrigation are given in ANNEX 3, Volume 2.

5.2.4 Credit Programme

Agricultural credit in Zambia is generally channelled through a number of parastatal organizations and the Zambia Cooperative Federation. Credits are mostly given to larger farmers, those who are commercially oriented for reasons of better control and administration of credit. The Government strategies in their effort to develop agricultural production include extension of credit to small-holder farmers enabling them to purchase necessary farm inputs and implements for an increase of their production.

None of the credit organizations mentioned is at present active in the Project Area. The only credit organization available to the farmers of the scheme is the Siatwinda Self-help Savings and Credit Union. This Union is a self-administered cooperative of farmers of surrounding villages. The Union was originally formed by irrigation farmers of the scheme with support and assistance from the Gossner Mission. Later on the Union was affiliated to the Credit Unions and Savings Association (CUSA) of Zambia and has thus become member of the national cooperative movement. The Gossner Mission is continuing giving assistance to the Credit Union. The operations of the Union appear to be well organized and efficient.

Farmers in the Project Area are farming at subsistence levels only. They do not have sufficient cash income for the purchase of farm inputs and implements. With the Project irrigation farmers will be required to apply and buy inputs and implements in order to support the other project measures.

Under the Project it is proposed to strengthen and expand the operations of the Credit Union in order that they will be able to extend the required credits to farmers of the Project. The proposals include:

- assignment of one additional bookkeeper from Year 2 and a second one from Year 6 with the further extension
- provision of funds for costs of training of the present field officer and the bookkeepers
- extension of the present office
- provision of office equipment and office furniture
- provision of one motorcycle
- provision of funds for additional operation and maintenance costs
- provision of funds for seasonal and medium-term credits to farmers.

Funds for assistance to the Siatwinda Credit Union would be channelled through CUSA.

Further details about agricultural credit are presented in ANNEX 6, Volume 2.

5.2.5 Processing and Marketing Facilities

Rice hullers for milling the paddy from the scheme are at present only in Lusaka and are owned by ZAMHORT. Transport of paddy to these hullers would be uneconomic with one-third of the weight to be lost after milling to husks. Instead, it is proposed to provide the Project with a rice huller of a capacity of 600 kg/h of paddy. The huller would be driven by electric motor with electric power from the new power line and would be housed in a simple extension of the present store of the scheme. The huller would be operated in April/May for about 50 days to polish all the paddy of the first stage of implementation (30 ha rehabilitation plus 30 ha extension). At full development about 100 days would be required.

The huller would be owned by the farmers' organization and farmers would pay for the processing of their paddy. The rice would be mainly sold by the farmers to SPCMU or traders directly. Provision for the purchase and installation of the huller and for the relevant facilities are made in the project costs (ANNEX 11, Table 4, Volume 2).

Transport of produce at present from the scheme to the markets is a constraint. The cropping pattern provides mainly for vegetables which are not easily perishable and easy to transport and also to store for some time. The transport capacity however would not be sufficient for carrying future output. Provision is, therefore, made in the project costs to provide the farmers organization with one truck of 7 t for the first stage of implementation. A second truck is proposed for the extension of the Project in the second stage.

This truck would be sufficient for most of the year to transport scheme produce to the market. During three to four months additional hired transport of one to two trucks would be required. The scheme truck would also carry farm inputs and other requirements to the scheme.

The truck would be owned and operated by the farmers' organization and would be given to the farmers against payment of the costs plus some small margin for the farmers' organization. Farmers will have to join together and organize market trips.

Personnel will be hired from the area to operate the rice huller and the truck(s).

Details about costs of processing and marketing facilities are given in ANNEX 7, Volume 2 of this report.

5.2.6 Supporting Services

Successful implementation of the production programme on the Project will require strengthening supporting services - extension, research and input supply. Details for improvement of these services are given in ANNEX 3, Section 3.3, Volume 2.

5.2.6.1 Extension Service

The extension service will be strengthened by

- increasing the number of staff from the present one officer to 5 by the 8th year of project implementation
- upgrading the technical and management capabilities by provision of short courses locally and abroad
- improving farmer training.

It is proposed that a Technical Officer (TO), with diploma qualifications, extensive field experience and post-diploma qualifications be seconded to the scheme at the beginning of Year 2 of project implementation. As the project expands, 3 additional staff of Agricultural Supervisor level will be needed. The TO will be the counterpart to the expatriate advisor. When the latter one will be leaving after 3 years the TO should be in a position to fully advise the farmers' organization and organize and guide the work of the extension staff. Adequate housing will be provided.

Short training courses or seminars, locally and abroad, will be provided. These courses/seminars must be of direct benefit to the staff in improving their technical and management competence on the Project. A total of 22 months up to Year 8 has been allocated for short courses/seminars.

Farmer training will be improved by provision of adequate funds to meet training expenses at training institutions, attending field days, transport costs for specialist trainers and purchases for visual aid materials.

5.2.6.2 Research

With the implementation of the Project, there will be adequate water to carry out research work at the scheme throughout the year. Research programmes oriented to the needs of the farmers at the Project and introduction of irrigated agriculture in the area will be developed. The focus of the programmes will include:

- trials to improve the yield levels of crops being grown by farmers
- trials on new crops or varieties with a view to introducing them in the farmers' cropping calendar
- irrigation practices, water-yield relationships, irrigation-fertilizer interactions for optimal yields
- possibility of double cropping of rice.

The planning and implementation of these programmes will need proper coordination with work of the Adaptive Research Planning Team (ARPT) which is to be established in the Province under the Southern Province Agricultural Development Project (SPADP) and the assistance of the National Irrigation Research Station (NIRS) and Mochipapa Regional Research Station.

To supervise and coordinate the research work and results, an experienced TO with requisite qualifications will be posted to the scheme at the beginning of Year 2. It is proposed that an Agricultural Assistant (AA) be posted to the scheme in Year 7 to assist the TO.

When the 30 ha extension is ready for implementation, 2 ha will be allocated for research work similar to that in the existing scheme as the soil types are somewhat different.

Two houses of appropriate standard will be constructed in Year 2 and Year 7 to house the TO and the AA, respectively. Provision has been made of short training courses or seminars for a total of 10 months spread over a longer period.

5.2.6.3 Input Supply

The essential inputs which will have to be adequately available at the right times on the Project are seeds, fertilizers and agro-chemicals.

At present there is no commercial organization which distributes horticultural seeds in the Project Area. The seeds are brought from Lusaka by a member of Gossner Service Team (GST) and resold to farmers. It is proposed that GST continues to organize seed supply with the farmers more and more organizing it themselves.

Fertilizer is distributed by SPCMU at all its depots in the area of which Siatwinda depot has the best storage facilities. Fertilizer distribution is normally done in August/September only. Fertilizer supplies will continue to be brought to the Project by the SPCMU. When, however, shortages of any type of fertilizer required occur, special arrangements will have to be made by the project management to meet the shortages. The truck to be provided for the Project would be available to carry inputs to the scheme.

At present, distribution of agro-chemicals required at the scheme is not effectively done by any organization. As in the case of seeds, a member of the GST brings the required chemicals from Lusaka or Choma. It is recommended that GST continues to carry out this function in addition to the seed supply with the extension staff and the farmers getting more involved and finally organizing this matter themselves.

5.3 Project Phasing and Implementation

5.3.1 Project Phasing

Upon completion of the present phase of feasibility study and detailed design it is intended to go right away into implementation of the rehabilitation of the existing scheme and of the extension by the first 30 ha (Stage I). The further extension should be started after completion of the first stage and its successful operation over a few years.

For the implementation of Stage I (rehabilitation and extension by 30 ha) a period of 5 years has been provided. During Year 1 (1988) only little project activity is provided through technical assistance as an emergency to help maintain the scheme at its present level of production and to assist in tender procedures. The year will be mainly required for project appraisal, loan negotiations and arrangements and for preparation for implementation. During Year 2 (1989) actual physical implementation of the Project would be carried out with construction of irrigation works, electrical power line and appurtenant facilities. Construction is estimated to take 6 months. First plantings would be at the end of that year. Year 3 (1990) would be the first year with full cultivation of the area in both seasons. During that year and Years 4 and 5 irrigation and agricultural practices will be introduced to farmers besides training them and advising them. Assistance for the initial Project would then be completed at the end of Year 5.

Parallel to the construction of the Project institutional subjects would be implemented. The additional extension and research staff will be recruited and trained in Year 2 prior to commencement of agricultural operations. Activities towards the formation and strengthening of the farmers' organization will also be initiated in that year. Preparations would be carried to the point that agricultural operations could start with the first plantings at the end of that year.

Continuous advice to and training of farmers by support staff would be given for a period of three years following the running in of the Project. A period of three years for assistance in the operation of the scheme and in training of the farmers has been felt necessary given the new technology which irrigated agriculture is to the population in the area.

A bar chart showing the implementation schedule of the Project is presented in Figure 2.

The further extension of the scheme is proposed to start in Year 6 after sufficient experience has been gained in the implementation and operation of Stage I of the scheme and in the improvement of agricultural practices. Implementation of extension is proposed to be carried out in blocks of 30 ha per year. The further extension would thus be completed in Year 9. Allowing for assistance and guidance in project organization and operation and improvement of agricultural practices for a period of one year after implementation of the last block, the further extension of the scheme would then be completed in Year 10.

Figure 2
Siatwinda Pilot Irrigation Scheme
Implementation Schedule of Stage 1

ACTIVITY	YEAR
	1 (1988)
Engineering support	— —
Project appraisal, loan negotiations	— — — —
Procurement	—
Construction of works	—
Recruitment and training of support personnel	—
Operation of scheme	—
Agricultural operations	—
Support and advisory services to farmers	—

5.3.2 Project Implementation

Originally the existing scheme was managed by the staff of the Gossner Service Team together with a Zambian manager. The farmers when becoming more experienced were gradually more involved in the management through the Executive Committee. At present the Committee is managing the reduced scheme without a manager but with advice and close guidance from the adviser of the Gossner team and the extension officer.

The irrigation facilities and the electric facilities within the scheme will ultimately be owned by the farmers' organization. The implementation of these facilities should be their responsibility, but the Farmers' Executive Committee does not have sufficient experience to order the equipment and to supervise construction of irrigation works and electrical installations and to operate the scheme. Assistance to the Committee through experienced advisers for project implementation and operation is required.

The electrical power line with all appurtenant facilities from Maamba to the scheme will be owned by the Zambia Electricity Supply Corporation (ZESCO). They will be responsible for final design and construction of this line and for its maintenance. The scheme will pay to ZESCO the applicable rates for the electric power consumed.

The initial rehabilitation of the scheme may be carried out directly by the expatriate technical adviser if he is given authority to disburse the funds appropriated for this task. The construction of civil works, land preparation, and the supply of pumps will be carried out by contractors to the MAWD as the employer and initial owner of the works. MAWD will also continue with responsibility for operation and maintenance by providing the necessary funds until the Project becomes self-supporting. The facilities may then be transferred into the ownership of a legally constituted farmers' organization. Agreement with ZESCO will be necessary to determine ownership and maintenance responsibility for the 11 kV line and transformer in the drawdown zone.

The strengthening and improvement of the extension service would be the responsibility of the respective departments of the Ministry of Agriculture and Water Development in the Southern Province. They would recruit and train the recommended staff and equip them as proposed herein. They would pay the salaries to this staff which also is provided in the project costs. The extension staff would be delegated to the scheme but would remain under the supervision and administration of the respective department. They will be included in any extension programme like the training and visit programme which is being introduced in the Southern Province at present.

As is at present, research with the Project will also remain the responsibility of the research branch of the Ministry of Agriculture. The respective departments would be responsible for the implementation of the recommendations made in the present study similarly as proposed above for the extension service. Close cooperation with the scheme management and the extension staff will have to be assured in order that requirements of the scheme are satisfied.

The implementation of the credit programme would be the responsibility of the Siatwinda Self-help Savings and Credit Union. Assistance would be given directly to them or channelled through the Credit Union and Savings Association of Zambia (CUSA). The Siatwinda Credit Union would hire the additional personnel, would arrange for the proposed training, would build the extension to their office and would purchase the required equipment. They would also administer the credit funds. Their accounts are audited regularly allowing also for control of proper spending of project funds.

5.4 Organization and Management

5.4.1 Farmer Participation and Organization

Presently, 75 farmers are participating in the Siatwinda Irrigation Scheme, cultivating plots of 0.2 ha. Due to the shortage of irrigated land, some have to share plots. The rehabilitation of the existing scheme and the first extension will bring the total area under irrigation to 60 ha or 300 plots.

Roughly 70 per cent of all sample households not yet participating in the scheme expressed their urgent interest in getting an irrigation plot, which, extrapolated to the Project Area, comes to 270 households interested in irrigation, not including the 75 present participants. Even if everybody would only demand one plot, the expressed interest would be more than sufficient to justify the project size. But only 10 per cent seem to be satisfied with one plot, 30 per cent want to get two and the remaining 60 per cent want three or even more plots. Even if one assumes these figures as being too optimistic, a conservative estimate arrives at a total demand of about 110 ha. Thus, the scepticism regarding sufficient participation does not seem justified.

The present scheme is self-administered and managed by the Farmers' Executive Committee whose members apparently do a good job and enjoy a good reputation. The system, however, lacks a legal frame. It is therefore recommended to establish a Primary Cooperative Society with the irrigation farmers as members.

People in the Project Area are already used to the idea of cooperatives, since there are three different cooperative societies existent: Siatwinda Credit Union, Maaze Consumers' Cooperative Society and Mweemba Multipurpose Cooperative Society. According to the Cooperative Act, the existing structure of the scheme can remain and the present Executive Committee can take over the functions of the Board of Directors. Thus, no principal major changes are required - which is a great advantage.

It is, therefore, proposed to form the Siatwinda Irrigation Cooperative Society, which has to be a single-purpose cooperative society, since in general only one multipurpose society per ward is permitted. This is acceptable and in order, as the paramount common interest and activity of its members will be agricultural production under irrigation. Although it has to be a single-purpose cooperative society, marketing and input supply can still be handled. The society then will act as an agent for SPCMU.

The detailed organizational structure of the cooperative society will be laid down in its by-laws. The present system of the Farmers' Executive Committee, consisting of 9 members elected by the General Meeting, as representative and administrative body, can remain. Its main powers and duties will include:

- deciding on principal policies of the society
- considering new applicants
- expelling members
- appointing sub-committees
- employing and supervising staff.

Sub-committees following the extension of the Project should be established in order to facilitate and decentralize the work of the FEC. For 60 ha and approximately 150 farmers 4 sub-committees are recommended, each having 5 members elected by the farmers of their respective area. These sub-committees should be in charge of the daily routine and also serve as intermediaries between the farmers and the FEC on the one hand and the farmers and the extension service on the other. This system allows a good participation of many farmers in the running of the Project and also facilitates the contact with the extension officers.

Detailed preconditions and requirements regarding membership shall be discussed with all farmers concerned and specified in the by-laws. This applies particularly to the rights and duties of the members and the measures to apply if members do not comply with the rules. It is, however, recommended to keep the plot size at 0.2 ha, but fix an upper limit of plots to be allocated to each single member.

Training courses, especially in the early stages, are proposed for both the leadership and the members. Enough time should be allowed for the farmers to get familiarized with the new concept. In no case should the formation of Siatwinda Irrigation Cooperative Society be pushed through; experience shows that those societies which are established without their members being very convinced of the idea are subject to failure. It is advisable rather to extend the period of training and gaining experience, and of registration.

With the farmers' organization becoming fully responsible for the scheme and with the extension of the scheme, more tasks will be placed on the Executive Committee, who at present work voluntarily without payments. A strengthening of the farmers' organization is required. The following is proposed to this effect:

- assignment of
 - 1 office clerk
 - 1 store keeper
 - 1 typist
 - 1 office orderly
- extension of office
- construction of 1 house (for clerk).

Details of the present and proposed farmers' organization are given in ANNEX 8, Volume 2 of this report.

5.4.2 Monitoring and Evaluation

Project monitoring and evaluation (M&E) is proposed as a management tool and feed-back mechanism to improve project implementation. The overall goal to which the Project shall contribute has been defined as improvement of living conditions of small holders in Mweemba Ward on a secure and long-term basis. The Project aims at increasing the income and improving the diet of the target group which will be achieved through the following outputs:

- establishment of functioning irrigation system
- improvement of cropping practices
- increase in agricultural production
- establishment of a credit system
- implementation of marketing facilities
- formation of a Primary Irrigation Cooperative Society.

A wide range of inputs and activities will be necessary to achieve these results (see ANNEX 9, Figure 1). Monitoring of the Project is proposed as a permanent exercise to assess the degree to which these results have been achieved.

The monitoring of indicators will be carried out by project staff and should lead to regular internal evaluations and consequently internal adjustments of activities within the given frame.

Special evaluations of the Project will be carried out, based on data collected through monitoring, but will be complemented by own investigations. The main concern of the special evaluations will be:

- comparison of actual with anticipated project results
- identification of project constraints
- proposals for problem solutions
- proposals for adjustments and modifications of the original project layout.

Two special evaluations are proposed: a mid-term evaluation of project progress would be carried out in the middle of Project Year 4, i.e. after 3 seasons of full operation and a final evaluation at the end of Project Year 5. For the mid-term evaluation local expertise from the University of Zambia or other suitable institutions may be utilized.

For further details about monitoring and evaluation of the Project reference is made to ANNEX 9, Volume 2 of this report.

5.4.3 Technical Assistance

The knowhow required to organize, manage and supervise the implementation and the operation of the Project is not sufficiently available in Zambia. Expatriate professional advisers are, therefore, recommended to be assigned of the following professions and with the tasks and durations of assignment mentioned:

Personnel	Tasks	Duration of Assignment months
Irrigation engineer	Engineering advice to existing scheme to maintain present levels and assistance in tender procedures	3 (1988)
Irrigation engineer	Organization and supervision of supplies, construction, and initial operation	9 (1989)
Irrigation agronomist	Organizational and management assistance to the farmers' organization for operation of scheme, advice and guidance to extension personnel and farmers on irrigated agriculture, monitoring and regular internal evaluation of Project	39 (1989 - 1992)
Evaluation specialist	External evaluation of project progress	2 (1991)(1) 3 (1992)

1) The first evaluation could be done by a specialist from the University of Zambia.

Assurance was obtained verbally from the Gossner Mission that their personnel would continue in the Project. Their advice will be mainly required for marketing of produce, for supply of farm inputs, for organizing of agricultural credit and for the formation of the farmers' cooperative. No additional provisions have been made in this study for the activities of the Gossner team.

A house will be constructed near the site of the Project for accommodation of the expatriate personnel. Prior to the availability of the house camp facilities will be used. It would, however, be preferable to rent one of the houses of the Gossner Mission at Kanchindu (5 km from the Project) if then available instead of building a new house.

For transport one four-wheel drive station wagon is provided as are the costs for moving of expatriate staff to Zambia.

Further details of technical assistance proposed are given in ANNEX 10, Volume 2 of this report.

5.5 Production, Markets, and Financial Results

5.5.1 Project Production

Project production will be gained from irrigated agriculture. In the existing scheme, which at present is only partly functional, the whole area of 26 ha net would be brought back under irrigation, of which 4 ha would be again used for trials and research. Project production on the existing scheme would replace partly a wet-season rice and a dry-season vegetable production. The other part of the scheme is not cultivated with the existing facilities.

Substantial yield increases of even more than 200 per cent are expected with the Project as compared to present and without-project yield levels. These increases will be due to sufficient and safe water supply and to a higher use of agricultural inputs besides improved cultivation techniques.

In the first 30 ha net of extension, which is land already allocated for irrigation next to the present scheme, the project production would replace a wet season only, rather low maize production on 2 ha. The rest of the land is not cultivated. In the further extension by 90 ha a wet-season maize crop of 30 ha only would be replaced by the project production. The rest of the area is not cultivated.

Incremental project production at full yield levels is estimated in Table 1.

Table 1 Siatwinda Pilot Irrigation Scheme
Incremental Project Production at Full Yield Levels

Crop	Incremental Production		
	Stage I		Stage II 90 ha extension
	30 ha rehabil. 30 ha extension	Total	
Rice	188	263	451
Beans (dry)	46	64	110
Soyabbeans	18	41	59
Potatoes	216	405	621
Tomatoes	89	163	252
Onions	146	205	351
Cabbage	130	217	347
Okra	28	109	137
Carrots	50	82	132

Source: ANNEX 3, Tables 7 and 24, Volume 2.

5.5.2 Marketing and Prices

Production of the Siatwinda Irrigation Scheme is planned mainly for sales in order to gain cash. Only 20 per cent is expected to be consumed by the farm families in addition to their rainfed production. Crops marketed would be grains/legumes and vegetables.

Rice and beans (dry) are at present being imported for human consumption. The policy of the Government is to substitute imports of foods. Soyabean are processed for oil for human consumption. The demand for vegetable oil which is not being met by national production can not be satisfied through imports due to foreign currency shortages.

Paddy of the scheme would be milled at the scheme and then sold to SPCMU for further distribution or directly to traders. Most of the production is expected to be sold in the Province.

Beans from the Project would be sold by the farmers mainly to traders where prices are better than those paid by SPCMU. Soyabean would be sold to the Refined Oil Products Company at Lusaka.

Vegetables, if marketed at the main seasons, would bring rather low prices. The project proposals, therefore, provide in the cropping calendars a scheduling of part of the vegetable production at times when markets are more favourable and prices higher.

The main markets for the vegetables from the Project would be in the towns along the railway line from Lusaka to Livingstone with smaller quantities to be sold in Maamba and other nearby places or to traders coming to buy right at the scheme.

Processing facilities for vegetables in other parts of the country are supplied already by production more close by. Only the Chikuni Fruit and Vegetable Producers Cooperative Society at about 150 km distant would take a limited quantity of tomatoes for processing.

Future prices of rice, leguminous crops and of parts of the vegetables are assumed to remain stable. Higher prices of 10 - 50 per cent can, however, be expected for vegetables like onions, okra, and carrots. Their planting season will be chosen such that sales will be when supplies are low. The truck(s) proposed for the Project will be an important item to assure good sales prices.

One important constraint to the farmers in the marketing will be the lack of information about the markets and marketing possibilities. A continuation of the Gossner Service Team in assisting and advising on marketing intelligence, on marketing arrangements and on organizing marketing activities is strongly recommended.

Further details of produce marketing and prices are given in ANNEX 7, Volume 2 of this report.

5.5.3 Farm Income

Besides having some livestock the majority of farmers in the area without Project are cultivating under rainfed conditions during one season of the year only. A few farmers (75) in addition cultivate twice a year at present on the scheme irrigated land of 0.1 to 0.2 ha. Rainfed cropping at present does not always satisfy total home consumption. During years of poor rains livestock is sold for cash to buy staple foods. Under irrigation, crops are grown mainly for the market in order to gain cash badly needed for purchase of necessary goods.

Under the Project irrigation is not considered to replace rainfed agriculture, but rather to supplement it for a safe cash income even in drought years. This would help the farm families to improve their living conditions.

Farm income for two farm models considered representative for without and with Project (full development) is shown in Table 2. Model A represents a farm of 3 ha under rainfed cropping only whilst Model B disposes of 5 ha of rainfed and 0.1 ha of irrigated land. Both have livestock.

With-project Model A would be cultivating 0.2 ha of irrigation land on the scheme in addition to present rainfed land. Model B would be given 0.1 ha of irrigation land in addition to present rainfed and irrigated land to also arrive at a total of 0.2 ha of irrigated land. Improvements in rainfed-crop and in livestock production are not expected with the Project. Farm labour of Model A is taken at 3 labour units and at 5 in Model B.

Table 2 Siatwinda Pilot Irrigation Scheme
Farm Income without and with Project

Model	Total farm income		Farm income per family labour	
	Without Project	With Project	Without Project	With Project
	K		K	
A	2,812	5,817	937	1,939
B	5,977	8,236	1,195	1,647

Source: ANNEX 3, Tables 13, 26, and 27, and ANNEX 12, Table 2.

With-project total farm income and farm income per labour unit of farm Model A would increase by about 100 per cent and of Model B by about 40 per cent as compared to their without-project situation. The smaller increase in income of Model B is due to the fact that it is cultivating 0.1 ha of irrigation land already and is given in the calculations 0.1 ha only of additional irrigation land. Farms represented by Model B would be in a position to cultivate even more irrigation land as far as their labour force is concerned.

The farm income calculations without Project include present water fees to be paid by farmers. With Project higher water fees as proposed in Section 5.5.4 hereafter have been adopted.

5.5.4 Cost Recovery

With the Project farmers should fully pay for the water supplied to their fields and not only for part of the costs as is at present.

The irrigation scheme will be run by the farmers' cooperative. The costs of supplying irrigation water will comprise costs of replacement of worn-out equipment, of maintenance of the facilities, and of operation and administration of the scheme. Total annual costs will vary between K 1,411/ha and K 3,915/ha (in 1987 prices) during the life of the Project. Adjusted to equal annual amounts this will be K 2,105/ha (see ANNEX 12, Table 1).

If farmers will be charged with the full costs which would be more than they are to pay at present (K 1,150/ha) but less than the actual present costs of K 2,300/ha the cooperative would break even from Project Year 13 on. A gradual increase of water fees over 5 years from present levels to the full cost level is allowed parallel to the expected yield increases. The deficits during the transition period of Years 1-12 would be covered from project funds. From Year 13 to Year 25 the cooperative would stay on its own and even generate a surplus of more than K 450,000/ha at the end of Year 25.

In order not to burden farmers too much, it is proposed to charge a reduced water fee of K 2,000/ha which will require a higher support from project funds by about K 100,000 in total during Years 1-12.

The cooperative from Year 13 to Year 25 would still accumulate a surplus of about K 250,000 which is considered sufficient to cover risks and unforeseen expenditures in their operations.

The reduced water rate has been adopted in the farm income calculations with Project (see Section 5.5.3).

Detailed cash flow calculations of the cooperative and farm income analyses are prepared in ANNEX 12, Table 1, Volume 2.

5.6 Project Costs

Total costs of the first stage of implementation (rehabilitation plus 30 ha extension, Years 2 to 5) and of the pre-implementation engineering period (Year 1) at 1987 price levels including physical contingencies of 10 per cent are estimated at K 21.6 million (DM 4.8 million). Of this total about 52 per cent will be required in foreign exchange.

During the period of study the foreign exchange regulations were changed twice by the Government. For the conversion of foreign exchange costs into Kwacha the rates fixed at the beginning of May were used. These are:

$$\begin{aligned} \text{DM } 1.00 &= \text{K } 4.50 \\ \text{US\$ } 1.00 &= \text{K } 8.00. \end{aligned}$$

Total project costs of Stage I including inflation will be K 31.7 million (DM 5.2 million).

Financing requirements for Stage I including local and international inflation respectively are estimated for local expenditures at K 14.7 million plus DM 2.7 million for foreign currency costs.

Estimated costs for Stage I are summarized by project components in Table 3. Details of cost estimates are given in ANNEX 11, Tables 1 - 8 (Volume 2 of this report).

The project costs include costs of initial investments, operation and maintenance costs and costs of personnel for the implementation and pre-implementation period. Incremental costs of agricultural production (e.g. costs of inputs and farm implements) are not included. These will be borne by the farmers themselves.

Costs of equipment imported by the Project do not include customs duties. The Project being supported by the Government and foreign assistance is expected to be exempted from such duties. Costs of imported equipment and materials bought locally and for which customs duties have been paid already include the duties.

Total costs of Stage II of implementation (90 ha extension, assumed in Years 6 - 10) at 1987 constant prices including physical contingencies of 10 per cent are estimated at K 13.6 million (at present exchange rate DM 3.0 million). No inflation was added to these costs as inflation assumed for such future period of time would be rather speculative. A summary of these costs is presented in Table 4. Details of cost estimates for Stage II are given in ANNEX 11, Tables 9-16.

Table 3

Siatwinda Pilot Irrigation Scheme
Summary of Project Costs Stage I

Project Component	(in K)			(in DM)			Foreign exchange in %
	Total	Foreign	Local	Total	Foreign	Local	
Irrigation infrastructure	5143400	169200	4974200	1142978	37600	1105378	3.29
Electrification	4722310	2705893	2016417	1049402	601310	448093	57.30
Farmer's co-operative	1786168	1045768	739400	396926	232615	164311	58.60
Extension service	316072	53500	262572	70238	11889	58349	16.93
Research	326340	96900	229440	72520	21533	50987	29.69
Support to credit union	546804	36406	510398	121512	8090	113422	6.66
Technical assistance	6767360	6085500	681860	1503858	1352333	151524	89.92
Total project costs	19608454	10194167	9414287	4357434	2265370	2092064	51.99
Physical contingencies, 10%	1960845	1019417	941429	435743	226537	209206	51.99
Total costs in 1987 prices	21569299	11213584	10355716	4793178	2491907	2301270	51.99
Financial contingencies (1)	10121048	5734946	4386102	384959	224033	160926	
Total costs	31690347	16948530	14741818	5178137	2715940	2462196	

Source: Annex II, Table 1

1) Financial contingencies for inflation in local currency were applied at the rates of 20, 15, 10, 10 and 10 per cent for the years 1988 to 1992 respectively.

Inflation in foreign currency was applied at the rate of 3 per cent for the years 1988 to 1992.

Exchange rate: DM 1 = K 4.5.

Table 4

Siatwinda Pilot Irrigation Scheme
Summary of Project Costs Stage II

Project Component	(in K)			(in DM)			Foreign exchange in %
	Total	Foreign	Local	Total	Foreign	Local	
Irrigation infrastructure	2074000	210600	1863400	460889	46800	414089	10.15
Electrification	445500	---	445500	99000	---	99000	---
Farmer's co-operative	2493192	1530915	962277	554043	340203	213839	61.40
Extension service	734560	138000	596560	163236	30667	132569	18.79
Research	339070	100500	238570	75349	22333	53016	29.64
Support to credit union	149700	40724	108976	33267	9050	24217	27.20
Technical assistance	6170250	5748470	421780	1371167	1277438	93729	93.16
Total project costs	12406272	7769209	4637063	2756949	1726491	1030458	62.62
Physical contingencies, 10%	1240627	776921	463706	275695	172649	103046	62.62
Total costs in 1987 prices	13646899	8546130	5100769	3032644	1899140	1133504	62.62

Source: Annex II, Table 9

6. Benefits and Justification

6.1 Social Effects and Benefits

The Project through the proposed rehabilitation and extension of the existing scheme will increase the number of irrigation plots available to farmers. In other words, more farmers will have access to this sophisticated form of agricultural production. Irrigation agriculture requires not only a higher level of know-how than traditional rainfed agriculture, but also a more precise timing of activities and a precise timing throughout the year. This, of course, requires some changes in the attitudes especially of the men who traditionally have a quite relaxed approach towards agriculture.

Oxen work like ploughing and harrowing, but probably in the medium run also transporting will have to increase, and working with oxen is traditionally the task of the men. It can, therefore, be assumed that the work load for men will expand, which is not necessarily accompanied by a reduction of the women's burden. On the contrary, participating in the scheme will mean to them an additional strain, which they apparently are willing to take due to the expected improvements in their living conditions. This strain will even be more severe for those men and women living in the more distant villages who partly will have to walk more than one hour to reach the Project. Only experience can show whether people are able and willing to accept this burden, which thus far seems to be the case.

One of the first effects of the Project will be a much better food supply for the project population. Gwembe Valley is extremely drought endangered and affected and subject to famine outbreaks. In addition, the diversified cropping pattern with a wide range of vegetables as source of vitamins will lead to a much better and more balanced diet and thus contribute to a generally improved nutrition and, at least indirectly, improve the health situation.

Production output is not limited to home consumption, but to the greater extent for sale, thus providing the opportunity to earn cash. This cash might offer a great deal of new consumption and/or investment possibilities and will definitely contribute to a general improvement in the standard of living. Highly appreciated by the people will be the fact that this income is not limited to a singular payment but will be at hand almost throughout the year.

Both, improved diet and more cash income do not affect the social services like health care and education, but do have indirect positive impacts. Cash income will be valuable to the people, especially for education which during the last few years has become rather expensive.

Irrigation due to the standing water can also adversely affect the living conditions and particularly the health state of the people. Bilharzia and malaria are very likely to increase and measures of protection should be seriously considered.

A last aspect to be mentioned is the supply of drinking water. Although not directly influenced by the Project, the supply is in such a desolate state that activities for improvement need to be taken. Otherwise, it is most likely that people increasingly will use water from the irrigation system for consumptive purposes and thus even worsen their state of health.

The formation of the proposed Siatwinda Irrigation Cooperative Society could launch a new phase of self-sustaining development. If people get the feeling that they will be supported in running their own matters, they might gain self-confidence and get encouraged for further activities. The proposed structure leaves much room for the participation of farmers in the development of the Project, and if farmers will be adequately assisted and educated in this form of active participation, their capacities for self-development will be strengthened, and through this institution building the structures for further development favourably influenced.

Irrigation farming as an additional activity to the traditionally practised rainfed agriculture will increase the labour requirements. Idle family labour is still available and may be induced to stay in the Project Area and take the chance of earning a living this way rather than emigrate to the urban areas.

On the same line, but definitely not a short-term effect, might be a general expansion or introduction of other economic activities, especially caused by the proposed electrification. Inexpensive, readily available power combined with increased agricultural production could, for example, pave the way for some crop-processing industries. This, of course, will also influence the community structure, not only through a higher degree of involvement in the market/money economy, but also in that people from outside the area will enter the region and cultural exchange with all its impacts will develop.

6.2 Economic Benefits and Justification

Direct quantifiable benefits would stem from the incremental production expected as a result of the rehabilitation and the extension of the scheme. Benefits are also expected from better crop prices. Cropping calendars with the Project provide for vegetables to partly be sold when supplies are low and prices higher.

Benefits from the Project will increase over a period of 5 years with the farmers becoming more acquainted with the production techniques and the proper application of farm inputs. Benefits without Project are assumed to remain at present levels. The import parity price for rice and likely future farm-gate prices of the other crops were used in estimating the benefits of the Project. Present economic farm-gate prices were used for estimating the without-project benefits.

Total project benefits expected from incremental production are estimated at K 2.1 million per year at full development for the first stage of implementation and at K 5.2 million after the second stage of development. Almost half of these benefits would be derived from rice, one-quarter from potatoes, one-tenth from onions, and the remainder from beans, soyabean and various vegetables.

Benefits and costs in the analysis have been projected over a period of 25 years assumed as the life of major investment items.

For capital items replacement costs were provided in the analysis at the end of the economic life of the respective item. Costs of agricultural production (of inputs and implements) were included in the analysis for the whole period of project life at their economic values. Costs of operation and of maintenance of all works, equipment, and facilities were also projected for the life of the Project, as were the costs of personnel.

The costs of construction of the electric power line up to the scheme and also the costs of technical assistance were not included in the economic analysis as suggested in the terms of reference. Costs of houses were also not considered. Houses would generate benefits, which, discounted to their present-day value can be considered equal to their costs. The benefits from housing have, therefore, also been excluded. Also the costs of the agro-meteorological station which will serve general purposes have been excluded from the analysis.

Shadow exchange rates of:

DM 1.00 = K 8.10
US\$ 1.00 = K 15.00

have been applied which were the rates at the free auction system prior to the introduction by the Government of fixed exchange rates at the beginning of May.

The economic internal rate of return (EIRR) of the overall Project (150 ha) has been calculated at 13.0 %. This, however, assumes that the 90 ha of extension area in the drawdown zone of the lake will always be accessible and under cultivation. The reality, however, will be fluctuating lake levels, the intervals of which can not be predicted. It is, therefore, assumed that 75 per cent of this area on average can be cultivated each year (see ANNEX 4, Section 3.3.3). The rate of return then will be 11.2 %. This is considered as the realistic situation or base case in the analysis.

Sensitivity tests of this base case for varying assumptions of costs and benefits were prepared. The results are shown in Table 5.

Table 5

Siatwinda Pilot Irrigation Scheme
Economic Internal Rates of Return

Assumption	EIRR %
Base case	11.2
Production or prices - 10 per cent	8.6
Production or prices - 20 per cent	5.6
One year delay in completion of project implementation	8.6
Project costs + 10 per cent	9.5

Source: ANNEX 12, Table 3.

The Project appears more sensitive to reductions in production output and prices than to cost increases.

If implementation of the Project in the first stage already (30 ha rehabilitation and 30 ha extension) will make provisions for capacity increases for the further extension and if this extension by 90 ha will not be realized for whatever reason, the 60 ha only would then have an EIRR of 8.1 %. If from the beginning provision will be made for implementation of the 60 ha only the EIRR will be 9.6 %.

When also adding into the economic analysis the costs of electrification - which originally were excluded - the EIRR of the Project at base case will then be 6.1 %.

As the EIRR of 11.2 % of the base case shows, it would be most economical to aim at implementation of the whole Project of 150 ha from the beginning.

Details of the economic analysis are given in ANNEX 12.

7. Outstanding Issues

The Kariba Lake was established for power generation. Abstraction of water for other uses therefore requires the consent of the operating authority, the Central African Power Corporation (CAPCO). The use of water by Siatwinda Irrigation Project will have an insignificant effect on power generation, but the Government of Zambia may need to go through the formality of arranging consent.

The drawdown zone of the Lake is also under control of CAPCO. Permission may therefore be required to construct the pump stations and erect the power line, if not actually to cultivate the zone.

Confirmation of the Gossner Mission has to be obtained for the continuation of their activities in the Project together with an arrangement for a proper coordination of their activities with the other activities proposed herein.

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Aachen, den 9. Nov. 1987

Betr.: Bericht über die Beratung in Sinazeze/Gwembe,
vom 8.09. bis 15.09. 1987

Sehr geehrte Damen und Herren,

ich hatte in Sinazeze versprochen, den Bericht in englischer Sprache zu verfassen, damit auch Ihre afrikanischen Partner den Bericht lesen können. Aus zeitlichen Gründen war es mir nicht möglich dem Versprechen bis zu diesem Zeitpunkt nachzukommen. – Bitte haben Sie dafür Verständnis. Die Übersetzung wird im Kürze nachgereicht.

Beiliegend finden Sie zunächst nur die deutsche Fassung.

Obgleich der Besuch aus der Sicht von Herrn Heinelt leider sehr spät stattfand, weil sein Vertrag abläuft, bin ich doch überzeugt daß der Workshop seine Früchte trägt.
Sollten sich Fragen ergeben, dann stehe ich Ihnen gerne zur Verfügung.

Mit freundlichen Grüßen

Merschmeyer

Anlage

Gerhard Merschmeyer - Projektreise nach Tanzania, Malawi, Zambia,
vom 25.06. bis 17.09. 1987

2.0 GOSSNER SERVICE TEAM, Sinazeze/Gwembe

Gesprächspartner:	Walter Heinelt, Ingenieur, E.H. Mr. Hanalopele, Project Coordinator Pfarrer Urich Luig, Project Advisor Mr. Amon S. Syanziba, Preacher Mr. Ncite, Building Supervisor
Besuchstermin:	08.09. bis 15.09. 1987
Besuchte Orte:	Sinazeze
Beratungsauftrag:	Workshops abhalten über die Herstellung von Wand- und Dachbaustoffen aus lokalen Rohmaterialien. Energiesparendes Brennen erläutern.

2.1 Grund des Besuches - Vorgeschichte

Im Herbst 1984 besuchte mich der Entwicklungshelfer Walter Heinelt, Wasserbau-Ingenieur in Villingen, um sich vor seinem Einsatz im Gwembetal/Zambia, für die GOSSNER MISSION Berlin, über einschlägige Fragen der Ziegelherstellung zu informieren. Bei diesem Besuch wurde vereinbart, daß Herr Heinelt bei Bedarf um eine Beratung anfragen kann. Vor Ort stellte er dann fest, daß im Zusammenhang mit der Beschaffung von Bedachungsmaterial Fragen der Rohmaterialbeschaffung und der Energie, einer grundlegenden Beantwortung bedürfen.

Eine konkrete Anfrage für einen Besuch in Zambia wurde vom Vertreter der GOSSNER MISSION Berlin, Herr Mische, anlässlich seines Besuches in der Geschäftsstelle, 1986 vorge tragen. Eine Beratung bei Herrn Heinelt wurde für den Sommer 1987 in Aussicht gestellt.

Zur Vorbereitung auf den Besuch hatte Herr Heinelt einen Fragebogen beantwortet und Lehmproben zum Analysieren geschickt.

2.2 Das Projekt - Problematik - Situation vor Ort

Die GOSSNER MISSION Berlin startete die Projektarbeit im Gwembetal im Jahr 1970. Partner sind United Church of Zambia und die Regierung. (Provincial Agricultural Development Council)

Der Schwerpunkt lag auf dem Sektor der Landwirtschaft und der Bewässerung. Später wurden Small Scale Activities gegründet, für: joinery, tailoring, blacksmith/metal work, boat building, shop-keeping, cement block-, brickmaking und building construction.

Zur Zeit arbeiten im Projekt sechs Entwicklungshelfer.

.../2

Mit dem Einstieg des Entwicklungshelfers Heinelt wurden diese Aktivitäten im Bereich der Baumaterialbeschaffung erweitert. Im Rahmen des Small Scale Promotion Programms nahm er sich unter anderem der Herstellung von gebrannten Dachziegel, Erdbrocksteine und Zement-Dachsteine an. Dies schien deshalb sinnvoll, weil die Bevölkerung in Gwembe South, gegenüber anderen Landesteilen vom Zugriff auf die Lieferung jeglichen Baumaterials abgeschnitten ist.

Da im Gwembetal das Ziegelbrennen Tradition hat, galt das besondere Interesse Heinelts dem Anliegen der Verbesserung der Ziegelsteinqualität, der Einführung von Tondachziegel und dem Brennen der vor Ort gewonnenen Kohle anstelle des üblich verwendeten Feuerholzes.

Um den Ursachen für die mindere Qualität auf die Spur zu kommen, machte er Versuche mit dem örtlichen Rohmaterial, formte Tonziegel, baute einen Probeofen und brannte den Besatz mit Holz und Kohle.

Die Ergebnisse stellten ihn nicht zufrieden, sodaß er über die Geschäftsstelle in Berlin um eine baldige Beratung nachsuchte. Eine Reise nach Zambia ließ sich kurzfristig nicht verwirklichen, obwohl die Beratung "gerade zum richtigen Zeitpunkt" gekommen wäre, wie Heinelt jetzt feststellte, nämlich während der Hälfte seines Vertrages.

Weil die Angelegenheit, die Herstellung von Bedachungsmaterial, der "Bevölkerung unter den Nägeln brennt", begann er Zement-Dachsteine zu produzieren. Das dazu notwendige Werkzeug wurde in den eigenen Werkstätten hergestellt. Die Qualität der Dachsteine war zufriedenstellend. Hier bedurfte es des weiteren Ausbaues der Produktion.

Da zwischenzeitlich der Besuch des Beraters angekündigt war, erwartete Heinelt auch konkrete Hilfestellung in diesem Bereich. Er stoppte die Aktivitäten und konzentrierte sich auf die Fertigstellung der im Bau befindlichen Brunnen sowie der Planung und Ausführung eines Small Scale Activity Centres in Sinazeze.

Zur Vorbereitung auf den Workshop ließ Heinelt Ziegelsteine formen. Zur Teilnahme gewann er Arbeiter und Mitarbeiter aus dem Team sowie private Handwerker aus der weiteren Umgebung.

2.3 Die Workshops

A l l g e m e i n e s

Nach dem ersten Einführungsgespräch und einer Excursion zu verschiedenen Ziegelfeldern wurde vereinbart sofort mit zwei praktischen Workshops zu beginnen. Den ersten auf dem Baugrundstück des Small Scale Activity Centres über Ziegelherstellung und den zweiten im Bauhof beim GOSSNER SERVICE TEAM über die Herstellung von Zement-Dachsteine.

Insgesamt konnten elf Teilnehmer gewonnen werden, darunter Maurer, Schreiner, Ziegelbrenner, ein Laienprediger und ein Vorarbeiter. Aufgrund von Sprachschwierigkeiten mußten die theoretischen Ausführungen übersetzt werden.

Thematik : Ziegelherstellung

Die Excursion zu den Ziegelfeldern und die Gespräche mit den Ziegelbrennern bestimmten die Thematik des Workshops:

- > Verbesserung der Ziegelqualität durch Formgebung und Brennen.
- > Brennen der Ziegelsteine mit Kohle statt wie üblich mit Holz.
- > Besseres Ausnutzen der in den Ofen eingebrachten Brennenergie.

Der Workshop begann mit einer Standortbestimmung. Die Teilnehmer wurden gefragt: „Welche Probleme haben Sie mit der Herstellung von Ziegelsteinen?“

Die Liste war sehr lang! Angefangen von der Aufbereitung (Wassermangel), Formgebung (verschiedene Ziegelformen), Trocknung (Rissbildung), bis hin zum Brennen (hoher Ausschuß durch schwach gebrannte Ziegel). Sogar die verkauften Ziegel bereiten Probleme, weil die Steine dazu neigten im Mauerwerk „auszublühen“, d.h. auf der Wand Salze abzulagern.

Im Vergleich zum teureren Zement-Blockstein, meinten einige Teilnehmer, sähe es so aus, daß die Absatzchancen besser wären, wenn die Ziegelsteine dieselbe Größe hätten. -- Diese Aussagen machten deutlich, wie gering das grundlegende Fachwissen bei den Ziegelbrennern ist.

Zur Klärung all dieser Fragen reichte die vorgesehene Zeit natürlich nicht aus. Deshalb beschränkte sich der Workshop auch auf die Vermittlung einfacher Techniken und Regeln. Die Thematik für den Workshop war deaher richtig gewählt. Geändert wurde die zeitliche Einteilung von theoretischer Unterweisung und Praxis zu Gunsten von $\frac{3}{4}$ praktischer Tätigkeit. Dies war Dank der Vorbereitungen, die Heinelt getroffen hatte, möglich.

Das praktische Arbeiten begann mit der Suche nach verschiedenen Erdmaterialien auf dem umliegenden Gelände. Mit Hilfe einer einfachen Sedimentationsanalyse - Flaschentest - lernten die Teilnehmer die Unterscheidung der einzelnen Erden für das jeweilige Produkt, ob Ziegelstein, Dachziegel oder Erdblockstein, kennen.

Hier vernahmen sie zum ersten Mal, daß die gute, oder die schlechte Qualität ihrer Produkte von der Einschätzung her an diesem Punkt seinen Anfang nimmt.

Als nächstes befaßten sich die Teilnehmer mit einer ihnen fremden Methode der Tonaufbereitung. Sie lernten, das Tonmaterial nicht mehr ausschließlich mit den Füßen zu bearbeiten, sondern diese ausgesprochen harte und schwere Arbeit weitestgehend durch eine neue Technik zu ersetzen. Die Tatsache, daß der Faktor Zeit mithilft, den Ton aufzubereiten, ihn aufzuschließen, konnte nur durch das Demonstrieren eines praktischen Beispiels verstanden werden. Die theoretischen Erläuterungen der neuen Aufbereitungsmethode erschienen allen Teilnehmern, ohne Ausnahme zu unglaublich, denn diese Methode hatten sie „von den Vätern gezeigt bekommen“.

In der Tongrube wurde im kleinen Maßstab vorgeführt, was unter der neuen Technik zu verstehen ist, wie die sog. "Clay Preparation Boxes" aussehen. Sie sahen, wie das Rohmaterial lagenweise, und abwechselnd mit Annachwasser begossen, in die Boxen eingebracht wird, damit es durch die Faktoren von Zeit und Druck allmählich plastisch wird.

Die Richtigkeit dieser Methode stellte sich dann am folgenden Tag heraus als die Box geöffnet wurde, um festzustellen, daß der Ton ohne sichtbare Einwirkung über Nacht weich geworden war. Die weitere Bearbeitung des Tones erfolgte dann zur Überraschung der Teilnehmer mit einer Schaufel. Das Kneten mit den Füßen war nicht notwendig. "Wer das hier nicht gesehen hat, glaubt es nicht", meinten die Zuschauer.

Weiteres grundlegendes Wissen wurde bei dem Thema Ziegelmaße, Ziegelformen und Formgebung vermittelt. Das war deshalb wichtig, weil nahezu jeder Ziegelbrenner Steine von unterschiedlicher Größe herstellt und die Steine sich außerdem aufgrund der Konstruktion der Ziegel-Holzform bei der Formgebung verziehen.

Neu war, daß der Ton sowohl beim Trocknen als auch beim Brennen schwindet. Dieser Tatbestand wurde von den Ziegeln bei der Bemaßung der Holzform für die Formgebung der Ziegel nicht berücksichtigt. Zum Teil war auch nicht bekannt wie groß die Abmessungen der Steine laut Vorschrift sind.

Die Zusammenhänge von der Schwindung der trockenen und gebrannten Ziegel, sowie die Größe der Ziegel-Holzform konnte an den Objekten selbst erläutert und einsichtig gemacht werden.

Zum Erlernen der richtigen Formgebung mußten die bekannten Holzformen abgeändert werden. Bei dieser Gelegenheit bot sich an, eine neue, größere Ziegel-Holzform für die Herstellung von Blocksteine anzufertigen und dieses Steinformat den Teilnehmern zur Diskussion vorzustellen.

Die verbesserte Formgebungstechnik fand mit dem ersten praktischen Beispiel sofort die Zustimmung der Workshop-Teilnehmer. Mit einer einfachen Änderung an der Holzform war das möglich: Die neue Holzform hatte entgegen der Vorstellung der Leute keinen festen Boden als notwendiges Hilfsmittel zum Entleeren der Form, sondern einen losen Deckel. Mit Hilfe dieses Deckels ließ sich der in die Holzform gegebene plastische Ton form- und kantengerecht herausdrücken. Das Rütteln der Holzform, zum Zweck des Entleerens entfiel damit. Bei Anwendung der neuen Methode verzogen die Steine sich auch nicht. - Mit dem zuvor aufbereiteten Ton experimentierten die Ziegelbrenner erfolgreich. In bezug auf die neue Holzform zur Herstellung eines Blockziegels, so fanden die Teilnehmer, sei die Größe des Blockziegels noch nicht ausreichend um das Mauerwerk schnell hochzuziehen. Sie stellten sich einen Ziegelstein von der Größe eines Zementblocks vor. - Hier wurde nun deutlich gesagt, daß es zwar möglich ist einen noch größeren Stein herzustellen, dies aber aufgrund des Kenntnisstandes wohl fehlschlagen würde. Voraussetzung zum Erfolg sei bestens aufbereitetes Tonmaterial, korrekte Formgebung und das Trocknen im Schatten.

Heinelt hatte hier schon vorgearbeitet und eine entsprechend große Holzform angefertigt. Einem sofortigen Versuch stand damit nichts mehr im Weg. Die Formgebung des ersten Probe-steines gelang zur großen Zufriedenheit der Workshopteilnehmer.

Der Großblockziegel muß zunächst gebrannt werden. Erst dann ist eine endgültige Aussage über die Qualität möglich.

Der Workshop schloss mit dem Thema, energiesparendes Brennen von Ziegelsteine, ab. Aus zeitlichen Gründen war es nur möglich die wichtigsten Fragen des Ziegelbrennens zu behandeln. Bedingt durch die Tatsache, daß in der Region Kohle gefördert wird, lag hier der Schwerpunkt der Beratung: die Verwendung von Kohle zum Brennen.

Dank des Vorrates von mehreren tausend trockenen Steinen war es möglich, den gesamten Fragenkomplex der Teilnehmer, durch Bauen und Brennen eines Modellofens beispielhaft zu behandeln.

Die Steine werden in der Regel etwa je zur Hälfte mit Holz und Kohle gebrannt. Bis auf einen Teilnehmer war der Gruppe nicht bekannt, daß der Ziegelofen auch ausschließlich mit Kohle gebrannt werden kann. Dieser Teilnehmer, ein Laienprediger, war der Garant dafür, daß das Experiment zur Durchführung kam. Sein Wissen bedurfte nur der weiteren Information und einiger praktischer Hinweise. Beim Bau des Ofens wurde die zum Brennen der Steine notwendige Energie (Stück-kohle) mit in den Besatz gegeben. Dieser Vorgang konnte mit dem Aufbau des Ofens deutlich gemacht werden.

Neu für die Teilnehmer war das Isolieren des fertig gesetzten Ofens zur Vermeidung von unnötiger Wärmeabstrahlung. Diese Arbeit, so wurde einstimmig vermerkt, sei "Zeit- und Geldverschwendungen die nichts einbringt". - Gerade das Ummanteln des zu brennenden Ziegelbesatzes ist unumgänglich, sollen alle Steine an der Peripherie des Ofens gebrannt werden. Weiterhin schützt die Isolierung, aus gebrochenen Steinen mit Lehm verschmiert gegen Wärmeverlust und sorgt für spürbare Einsparung an Brennenergie. Fotos von Ziegelbrennereien in anderen Ländern die den Erfolg dieser Maßnahme zeigten, veranlaßten die Teilnehmer zur Ausführung der vorgeschlagenen Maßnahme am Modellofen.

Mit dem Anzünden des Ofens, das in weniger als einer Stunde erfolgt war, war der Workshop beendet.

Das Brennergebnis, darüber war man sich einig, konnte in der verbliebenen Zeit nicht mehr beurteilt werden. Da alle Teilnehmer am Ergebnis interessiert waren, wurde beschlossen, daß sich die Gruppe nach zwei Wochen wieder trifft um den Brand in allen Einzelheiten zu begutachten.

Thematik : Zement-Dachsteine

Das Herstellen von Zement-Dachsteine war für die meisten Workshopteilnehmer etwas ganz Neues. Attraktiv war es deshalb weil nur der Zement von außerhalb beschafft, Sand und Fiber

vor Ort gewonnen werden muß. Eine Schreinerei konnte das Handwerkszeug selbst herstellen. Im Vergleich zum Wellblech war dieses Material wesentlich billiger.

Den Teilnehmern wurde deutlich zu verstehen gegeben, daß die Technik zur Herstellung des Bedachungsmaterials wohl schnell zu erlernen ist, es aber der längeren Erfahrung bedarf um gute Qualität auf den Markt zu bringen. Mit der Herstellung der Dachsteine, so wurde gesagt, sei es ähnlich wie mit der Produktion von Ziegelsteine: denn wichtig ist die einwandfreie Aufbereitung, die korrekte Formgebung und das vorschriftsmäßige Abbinden der Dachsteine in einem Wasserbad.

Heinelt hatte bereits mehrere Quadratmeter Dachsteine geformt, sodaß sie einer Festigkeitsprüfung unterzogen werden konnten. Dabei stellte sich heraus, daß es in einem Punkt etwas zu verbessern gab, und zwar in bezug auf das Werkzeug. Mit dem selbstgemachten Werkzeug war es nicht gelungen, das für die Herstellung der Dachsteine notwendige Verdichten der Materialien zu erreichen.

Gemeinsam wurde nach einer besseren Lösung gesucht. Sie wurde bei der Herstellung einer Dachstein-Platte ausprobiert. Ein flächenmäßig größerer Dachstein wurde deshalb ausgewählt, weil der Berater einige Tage zuvor im Osten von Zambia, in Chipata, eine erfolgreich arbeitende Dachstein-Platten Produktion besichtigt hatte. Die angestrebte Lösung führte aber nicht zu einem befriedigenden Ergebnis. Was hier fehlte, war ein Rütteltisch zum Verdichten der Materialmischung.

Zu Gunsten des Ziegelbrennens mußte sich der Versuch auf die Formgebung einer einzigen Dachstein-Platte beschränken. (Eine Platte deckt soviel Fläche wie 16 Einzelsteine.) Mit dieser Vorführung endete der Workshop für die Teilnehmer. – Die Thematik war für Heinelt aber damit noch nicht erschöpfend behandelt. An dieser Stelle wurde ihm vorgeschlagen, mit dem Berater nach Kasisi/Lusaka zu fahren, um ein Appropriate Technology Workshop zu besichtigen. Hier würden erfolgreich Zement-Dachsteine mit einem Rütteltisch produziert. Dies sei auch deshalb sinnvoll, weil eine andere Dachsteinform hergestellt wird. Der Dachstein sei nicht flach sondern gewellt und hätte gegenüber seinem Modell den Vorteil, besser auf dem Dachstuhl zu liegen. In Kasisi konnte Heinelt dann auch brauchbare Anregungen für die Weiterentwicklung der Dachsteinproduktion in Sinazene bekommen.

2.4 Andere Baustoffe

Neben dem genbrannten Ziegelstein gibt es nur den Zementblockstein. Eine eigenes Arbeitsteam stellt die Steine für die Bauvorhaben her. Die Preise für Zement, Sand und Transport steigen weiter an. „Wie das weitergeht“, so wurde gesagt, „weiß keiner“.

Heinelt war zur Zeit des Besuches gerade damit beschäftigt, dem eigenen Bauteam erstmals vorzuführen, wie das Mauern einer Wand mit Bruchsteine gehandhabt wird, denn bislang wurden Bruchsteine nur für das Fundament verwendet.

Um eine Alternative zum Zementblockstein und Ziegelstein anzubieten, machte das GOSSNER TEAM den Versuch mit einer selbstgebauten, handbetätigten Presse Erdblocksteine herzustellen. Bei den Versuchen blieb es. Die Bedienung der Maschine stellte sich als zu aufwendig heraus, wohl bedingt durch die vielen beweglichen Teile und der geringen Verdichtung der Erde. Zur Zeit ist die Maschine außer Betrieb.

2.5 Feststellungen - Empfehlungen - Follow-up

Der Sprecher der Workshopteilnehmer, Mr. Amon, stellte bei der abschließenden Besprechung fest, in den wenigen Tagen sehr viel gelernt zu haben und daß jeder versuchen werde einiges davon umzusetzen. Für viele der Teilnehmer sei wichtig, so faßte er das Ergebnis des Workshops zusammen, daß "GOSSNER uns dabei unterstützt, das Gelernte zu verwirklichen". Der Berater schlug den Teilnehmern vor, diese Frage um ein Jahr zu verschieben, denn er werde in einem Jahr wiederkommen und sich zunächst einmal davon überzeugen wie fruchtbar der Workshop gewesen sei. Jeder Teilnehmer wurde aufgefordert in eigener Verantwortung zu beginnen und den Besuch abzuwarten. Denn dann ließe sich genau absehen wie es weitergehen soll. -

Dieser Beschuß wurde dann von allen beteiligten Seiten akzeptiert.

Für Heinelt stand auch fest, daß der Workshop den Teilnehmer viel gebracht hat, er selbst hätte sich einen wesentlich längeren Aufenthalt des Beraters gewünscht und diesen nicht gerade am Ende seines Vertrages. -

In der für ihn verbleibenden Zeit kann er das follo-up, das er gerne vorgenommen hätte, nicht mehr tun. Da für ihn noch kein Nachfolger im Projekt ist, dem er diese Aufgabe als Notwendigkeit anvertraut hätte, ist für ihn "guter Rat teuer".

Pfarrer Ulrich Luig meinte dazu, daß der Nachfolger, wann immer er kommt, über die Sache informiert wird und sich dann der Sache annehmen kann. Ich habe empfohlen, die Teilnehmer zu beobachten, um zu sehen was sie tun, was sie wirklich umsetzen und den Kontakt mit ihnen zunächst einmal nicht zu verlieren. Beim Follow-up Besuch Mitte des nächsten Jahres kann dann mit dem Nachfolger von Herrn Heinelt alles weitere besprochen werden.

Zur Festlegung des Reisetermines wurde darum gebeten, der Geschäftsstelle in Aachen Anfang des komenden Jahres mitzuteilen, wann der Besuch erfolgen soll.

2.6 Zusammenfassung

Der erste Kontakt liegt drei Jahre zurück. - Im letzten Jahr fragte Herr Mische, von GOSSNER MISSION Berlin, um eine konkrete Beratung in der Geschäftsstelle in Aachen an. Der Entwicklungshelfer Walter Heinelt, der einem Bauteam vorstehe, benötige die Beratung bei der Herstellung von Baumaterialien.

Bei der Kontaktaufnahme erläuterte Heinelt, daß er die vordringliche Aufgabe darin sehe, der Bevölkerung aufzuzeigen, wie aus lokalen Rohmaterialien Wand- und Dachbaustoffe hergestellt werden können. Dieses unter dem Aspekt der Verwendung der am Ort gewonnenen Kohle.

Anlässlich der Projektreise nach Zambia erfolgte dann die gewünschte Beratung in Sinazene/Gwembe.

Die Beratung erfolgte in Form eines mehrtägigen Workshops an dem neben Bauhandwerkern auch Ziegelbrenner teilnahmen. Nach einer Ortsbesichtigung und ersten Eindrücken über den Wissensstand der Teilnehmer, wurde entschieden, einen vorwiegend praktischen Workshop abzuhalten. Es ging darum, zunächst grundlegende Kenntnisse auf dem Sektor des Ziegelbrennens und der Herstellung von Zement-Dachsteine zu vermitteln bevor konkrete Maßnahmen zur Beschaffung von Baumaterialien anlaufen.

Die Teilnehmer stellten für sich abschließend fest, daß für die Umsetzung des Gelernten das Service Team behilflich sein sollte. Der Berater schlug den Teilnehmern vor, bis zum nächsten Jahr mit diesem Ansinnen zu warten und in eigener Verantwortung etwas zu unternehmen, denn es würde ein Folgebesuch stattfinden. Bei einem Zusammentreffen könnten weitere Schritte besprochen werden.

Zu diesem Zeitpunkt wird erwartet, daß der Nachfolger von Herrn Heinelt die Arbeit im Team aufgenommen hat und sich mit dem Anliegen seines Vorgängers vertraut machen konnte.

Die Anfrage für den zweiten Besuch des Beraters wird für Anfang nächsten Jahres erwartet.

Aachen, den 6. Nov. 1987

Landmeyer

Erhard.

THE UNIVERSITY OF ZAMBIA
INSTITUTE OF HUMAN RELATIONS
RURAL DEVELOPMENT STUDIES BUREAU

1. Project Description

(a) Title: Evaluation of the Gwembe Valley Development Company, Sinazongwe area, Gwembe South.

(b) Area: Sinazongwe, Sinazeze, Gwembe South.

(c) Duration: Fifteen days,

2. RESEARCHERS: Mr. N. Mulikita
Mr. A. Mwanza.

3. Funding: Gossner Service Team, Unnamed donor.

4. Project Outline

1. Population and History

The people of Southern Gwembe Region belong to the Tonga tribe which consists of two major groups: the plateau Tonga and the Valley Tonga or Gwembe Tonga. The latter lived along the banks of the river Zambezi until the construction of the Kariba Dam which created Lake Kariba, one of the greatest artificial lakes in the world (Brandt et al., 1973, p.8)

Before the end of World War II, the people of Gwembe valley lived almost untouched by government and modern development mainly because access through the escarpment was very difficult.

It was only in 1946 that Gwembe became a district and the Boma was opened at Gwembe. Roads were constructed for the first time, improved seeds were introduced and cash crops and cattle came out for sale. In 1956 work began on the Kariba dam which was finished in June 1959. The lake took three years to fill and reached its highest level in May 1960. It covers an area of more than 2,000 square miles and it caused the resettlement of more than 50,000 people. 34,000 of them were resettled on the Northern bank within Zambia. A large number of them, some 22,000 persons moved into the Southern Gwembe Region, into areas which were generally much less suited for agriculture than those which they inhabited before (Brandt et al, 1973, p.8). In their new settlements they had no possibility of cultivating winter gardens, so in years of poor rainfall the people had no reserves to count on and famine became typical for Gwembe district.

In addition to the social disruptions that were caused by the construction of the Kariba Dam, the people of Gwembe have had to put up with other hardships. Prominent among these is the intense and protracted guerrilla war that engulfed the area during the Zimbabwe war of independence. Thus famine and the break down of the socio-cultural structures of the Tonga people have become central characteristics of the Gwembe region.

Despite these and other difficulties there has been steady development in the area. Self help projects, small cooperative enterprises improved agricultural practices, small holder production of cotton and sunflower have contributed to improved living standards and increasing self reliance (Brandt, 1973), (Association for Regional Structural Development, 1973) etc.

2. The Gwembe Valley Development Company

The Gwembe Valley Development Company is a powerful conglomerate of both foreign and domestic capital that claims that it will engage in large scale agricultural production which will stimulate development in Gwembe South. The dominant firm in this group of firms is the American company Lummus, Lasoo, Visial. This firm controls about 70% of the capital shares in the G.V.D.C. It is reliably learned that this American firm has supplied equipment and machinery worth US \$19 million.

Hoescht, (Zambia) Ltd, the local subsidiary of the German Agri chemical multinational giant Hoescht owns about 10% of the capital investment in the G.V.D.C. Lintco, a Zambian parastatal company whose main focus is the purchase of cotton from Zambian farmers has been assigned 10% of the capital shares in the G.V.D.C. It has also been stated that the local people have been provided with an institutional mechanism to enable them to effectively and meaningfully participate in the operations of the G.V.D.C. This mechanism will take the form of the Zongwe Cooperative.

The G.V.D.C, has already embarked on a very rapid and vigorous campaign of land clearance that will encapsulate an area of 2,200 hectares: The land clearance campaign commenced in April 1986 and it was estimated that by July, 1986 the exercise would be complete. It is also reckoned that the first cotton crop will be sown in September. The G.V.D.C. also expects that the whole area will be under intensive irrigation by January, 1987 cotton is expected to be grown on a large scale between September and March whilst wheat will be grown between May and July annually. The G.V.D.C. has already made arrangements to secure electricity from the coal mines situated in Maamba.

The company has forecast that when its huge 'estate' comes on stream, 2,000 cotton pickers will be needed. As the company expands its operations more labour will be required. Perhaps migrant labour may be brought in to satisfy the increasing manpower needs of the company.

3. Private Foreign Investment; Towards a Correct Theoretical Perspective

Few developments have played as critical a role in the extraordinary growth of trade and capital flows during the past two decades as the rise of the multinational Corporation (mnc) (Todaro, 1981, p.400). The growth of private foreign investment in the Third World has been largely championed by mncs. Direct foreign investment involves much more than the simple transfer of capital or the establishment of a local factory in a developing nation mncs carry with them technologies of production, tastes and styles of living, managerial services and diverse business practices including cooperative arrangements, marketing restrictions, advertising and "transfer pricing" (Todaro, 1981, p.400). The purpose of mnc activities is far from charitable. In many instances, these activities have little to do with the development aspirations of the countries in which they operate.

David Tobis, writing about the Central American republic of Guatemala, illustrates with great clarity the dangers that confront nations which allow huge mncs to operate with unlimited freedom in the name of attracting greater private foreign investment.

"Today, there are many foreign investors in Guatemala. Conditions in the country have been made favourable for these investors. There are no transfer restrictions of any kind on foreign owned assets, dividends and interest. There is no fixed amount of profit which must be re-invested in local industry" (Fann and Hodges, 1971, p.250).

Finally at the political level, the danger always exists that powerful mncs have the ability to gain control over local assets and jobs. They can exert considerable influence on political decisions at all levels. In extreme cases, they may even, either directly by pay offs to corrupt officials at the highest levels or indirectly by contributions to friendly political parties, subvert the very political processes of host nations (e.g. ITT in Chile) (Todaro, 1981, p.406),

4. Rationale for Evaluation

Unless there is a sincere effort to understand and respect local institutions and the culture of the people in the Gwembe area, the advent of huge mncs such as represented by the G.V.D.C., portends serious dangers for the local inhabitants. The autonomy and self reliance of small organisations and less privileged individuals may be jeopardised. Local groups and people can easily be marginalised and pauperised by the new powerful economic structure,

The speed and methods used by G.V.D.C., up to July 1986 to advance their interests have shown little regard of or consideration for the social conditions of the majority of people living in the Sinazongwe area. i.e. villagers and farming families.

The study proposed here, therefore represents a preliminary attempt to monitor developments in the area with a view to highlighting advantages and disadvantages that may befall the inhabitants of the Sinazongwe area. It is also expected to provide the empirical basis for a longitudinal indepth evaluation to be undertaken in the near future.

5. Objectives of the Study

- (i) To establish what fate has befallen the local people who have to be resettled on account of losing their land to the G.V.D.C.
- (ii) To find out what the G.V.D.C. will do in connection with those people who have decided to stay within the project area (compensation etc)
- (iii) To estimate the overall number of people who have been affected by the activities of the G.V.D.C.
- (iv) To provide a socio-economic profile of the people who have been affected by the work of the G.V.D.C.
- (v) To find out whether or not the G.V.D.C. has fulfilled the promises made to the local people in order to secure the cooperation in its plantation scheme,
- (vi) To ascertain whether the Zongwe Cooperative offers the majority of the people in the area available institutional mechanism which may enable them to influence the decision making process in the G.V.D.C.
- (vii) To determine the extent to which the local party and government leadership in the area supported the project vis-a-vis the concerns of the local people in the area.
- (viii) To establish what legal/political process was followed which enabled the G.V.D.C. to gain permission to enter the area.

6. Research Plan

Sampling Strategy and Size

It is hoped that the research team can interview a minimum of about seventy respondents during the execution of the study. The study will also heavily rely on purposive sampling in the process of data collection. This decision has been necessitated by the fact that a great deal of social upheaval is taking place in Gwembe owing to the speed with which the G.V.D.C. is implementing its programme. Many families have already moved out of the project area and will be difficult to locate. All these limitations call on the researchers to respond with discretion and flexibility. The purposive sampling technique provides both flexibility and room for discretion in this regard (Mulikita, 1986, p.22).

Research Instrument

The objectives of this study require that data be gathered through a semi structured questionnaire. The questionnaire will be administered to the local people in the area with the help of research assistants who are fluent in Tonga.

Data Sources

In addition to data that will be gathered through a questionnaire it will be necessary to visit and interview officials at the sub-boma in Sinazeze. The local party and government leadership may also help to furnish the researchers with useful data. Any documentary evidence that may be of some relevance will also be sought in the course of the study.

Data Processing

The data will by and large processed with the help of the services of the computer centre of the University.

Production of the Final Report

It is hoped that this phase of the study will span about about two weeks. The report should be ready by the middle of September 1986.

7. The Budget (Revised)

<u>Item</u>	<u>Cost</u>
Overall Transport cost cover field work	K1,500.00
Night allowances for Principal Researchers (2) at the rate of K90.00 per day for fifteen days	K2,700.00
Night allowances for one driver at the rate of K60.00 per day for fifteen days	K 900.00
Night allowances for one Researcher Assistant for fifteen days at the rate of K10.00 per day.	K 150.00
Stationary to be used for data collection, analysis and writing up of the final report.	K 200.00
Contingency fund calculated at 15 per cent of the budget.	K 817.50
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Total Amount Required for the Evaluation	K6,267.50
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8. References

Brandt, H et al. (1973) Report on the Development Possibilities of Gwembe South Region (Zambia), German Development Institute, Berlin.

Fann, K.T. and Hodges D.C. (eds) (1971) Readings in U.S. Imperialism, Porter Sargent Publisher, Boston Massachusetts.

Todaro, M.P. (1981) Economic Development in the Third World, Longman, New York and London.

Mulikita, N. (1986), "Bureaucracy and Industrial Participatory Democracy", Draft Research Proposal, UNZA, Lusaka.

Rudi Buntel
1980

Evaluation Report on the "Gwembe South Development Project" of the
Gossner Mission/Berlin

Outline

1. Introduction:
2. Outline of the History of the Project
3. Conclusions on the Terms of Reference
 - 3.1 Are the Project Activities geared Towards Meeting the Basic Needs of the People?
 - 3.2 What is the Role of the Participation of the People?
 - 3.3 What are the Prospects of the Various Project Activities of Becoming Independent of Outside Help?
 - 3.4 What was the Impact of the Project on the Social Structures of the Valley-Tongas?
 - 3.5 What can be said about the Role of the Expatriate Team?
4. Comments to some Project Activities
 - 4.1 The Agricultural Approach in General
 - 4.2 Siatwinda Irrigation
 - 4.3 Nkandabwe Irrigation
 - 4.4 Buleya Malima
 - 4.5 Rural Work Programm/Dry Land Farming
 - 4.6 Valley Self-Help Promotion Fund
 - 4.7 Siatwinda Self-Help Savings and Credit Union
 - 4.8 Workshop
 - 4.9 Gwembe South Builders Coop.
 - 4.10 Water Supply
 - 4.11 Various Others
5. The Organisational and Legal Structure of the Project
6. Budget, Costing and Administration
7. Summary of the Report

1. Introduction

The Gwembe South Development Project (GSDP) is a collaboration between the Government Republic of Zambia (GRZ) and the Gossner Mission (GM) Berlin for the economic and social development of the Gwembe Valley (Zambia). The GM is providing a team of expatriate experts, while the GRZ provides the financial resources for running the various activities.

Because of a general fiscal crisis of the GRZ in 1979, the GRZ was not able to meet even the minimum financial requirements of the GSDP; the sum actually available fell short of the costs estimated in the revised budget by K 50,000, and was even K 30,000 lower than in the preceding years. The actual allotment fell short of K 50,000 in comparison with the revised budget; the finances available were even K 30,000 less than in the preceding years.

In agreement with the GRZ the GM asked the Running Costs Advisory Committee (FKA) of the Evangelical Mission Board of Germany (EMW) for financial support, to cover the deficit. The FKA agreed to assist the GSDP with a grant of K 46,800 in 1979, but was reluctant to repeat the offer for 1980. The FKA asked for an evaluation of the GSDP before further financial assistance could be considered. In cooperation with the GM I was appointed to look into the work of the GSDP and to report back to the FKA.

From March 12th to April 3rd, 1980, I visited the Gwembe Valley to get to know the work. Because it seems most probable that the GRZ will be able to fulfill its financial responsibilities for 1980, there was no longer any direct financial need for the GM to undertake this evaluation. The purpose of my visit was therefore no longer an assessment of the suitability of the Project for support from the FKA, but to start a dialogue with the involved persons, institutions and bodies on the strategy, methodology and aims of GSDP on the background of the last 8 years experience.

Since it was not possible to have a counterpart for this evaluation, the idea of an "evaluation seminar" came up. Towards the end of my stay in the Gwembe Valley a 3 days seminar took place to discuss some of the critical issues for the future of the project. 8 persons from various Zambian organisations, dealing with rural development were invited to this seminar. The participants discussed some recommendations and findings. The results of these discussion are included in this report.

Unfortunately because of time-constraints, I was not able to survey any effects of the Project in detail. The information and data in this report have mainly been collected by interviewing the various staff members, the farmers and their representatives and those civil servants, involved with the Project and by reading the files and reports. Although nobody can expect me to be aware of all facts and aspects, I want to appologise in case any mistakes or misunderstandings should be discovered. The report is necessarily highly subjective, since the terms of reference do not allow a quantification. But I do hope that my views, recommendations and remarks can be accepted as a challenge for improvement. During my stay in Zambia I have tried to continue a dialogue with all staff members, not only to communicate my ideas, but also to review them if necessary. Although this exercise has been called "evaluation", this term does not actually apply. The absence of any conscientious planning (aims and strategy) in the project made it very difficult to estimate the degreee of success and failure, since no practical criteria were available. Thus the only standards available for judging the quality of the work were imposed by an outside body, i.e. from the FKA.

The following questions, worked out by the FKA and the GM, served as the basic criteria for the evaluation of the Project:

1. Are the project activities geared towards meeting the basic needs of the peoples? (basic needs)
2. How far do the people participate in the planning and implementation of the project? (people's participation)
3. Which impact did the project have on the social structure of the Valley Tongas?
4. What are the prospects of the activities of becoming independent of external financial and personnel support?
5. What can be said about the role of the German Team?

The very critical tone of this report is not in any way intended to convey the impression that the efforts and involvement of the staff and other persons associated with the Project are not appreciated.

I am very sorry if I have created this impression. In fact I am strongly in favor of the Project, and I consider the work which has been done very worthwhile. It is because I am so much in favor of the work, that I feel obliged to disclose the threats to the Project, its weaknesses and the mistakes that have

been made. The critical remarks should not be seen as destructive criticism by someone who wants to run everything down, but as an attempt to plan for an improvement of the Project.

2. Outline of the History of the Project

1. The area of the Valley was chosen for collaboration with the GM for various reasons:
 - It is traditionally one of the poorest areas in Zambia.
 - The Kariba resettlement has accelerated the problems, because of
 - high density of population in the Valley,
 - higher vulnerability due to loss of river-gardens,
 - poor adaptation of the Valley-Tongas' farming practices to the new circumstances and environment.
 - Because of forced resettlement, Valley-Tongas opposed the government and refused to cooperate in development activities.
2. At the end of the 60's plans were being made to resettle Valley-Tongas again to ease the problems of land scarcity.
As the result of one study (Garbrecht-Study) the introduction of irrigation farming was meant as an alternative. It was believed that there is a development potential even within the Valley. To mobilize this potential, good planning and coordinated efforts by all governmental agencies were considered to be essential.
3. The concept as laid down as part of the agreement between GRZ and GM was
 - to set up a strong Gwembe Valley Co-ordinating Committee under a "Co-ordinating Officer" to co-ordinate the work of all organisations active in the Gwembe Valley,
 - to strengthen the position of this Co-ordinating Officer by subordinating to him the team of GM-experts, which assists the Co-ordinating Officer in his attempts for an integrated area planning and implementation.
 - to start a pilot irrigation project at Siatwinda, for which one member of the team will be responsible.
4. The idea didn't work. When the GM-team arrived in 1970, the Co-ordinating Officer had not yet been appointed. The local governmental departments had not even been informed about the arrival and functions of the expatriates. The Gwembe South Development Committee (GSDC) never really got off the ground. Its function was reduced from that of co-ordinating the work of all governmental bodies to guiding the GM team. The Co-ordinating Officer hadn't been appointed because it seemed neither opportune for politically feasible to create a position powerful enough to direct all the development work of the valley.
5. The GM-team decided to stay in the Valley, in spite of the fact that the GRZ was unable to stick to the agreement. The whole concept of the GM-involvement in the Gwembe Valley was changed by necessity: The GM-team started its own development activities alongside the activities of the various governmental departments. They began with the Siatwinda Pilot Irrigation Scheme (SPIS) which was designated to them in the agreement. Complimentary activities like Community Development, Nutrition Extension, construction and Water Supply

were added during the next years.

6. The Gwembe South Development Project (GSDP) as a development institution of the Central Government, almost independent of the District and Provincial planning and administration structures, has thus evolved. Most of its activities have been started by the ideas of the expatriates. There is no structural integration or co-ordination with governmental bodies and no effective public control over their work. The efficiency of the GSDP vis à vis the local governmental departments in their respective fields of work is partly due to the privileged access to Central Governmental resources and the independence of the expatriate team.
7. Today the GSDP is still focussing on irrigation farming. Beside Siatwinda (SPIS) the scheme of Nkandabwe was handed over by the Government to the GSDP.

Buleya Malima (BM), a third irrigation scheme, will also be taken over by the GSDP in the near future. The other major activities of the GSDP are the Rural Works Programm (RWP), combined with the Dry Land Farming (DLF), the Siatwinda Credit Cooperative, and the Gwembe South Builders (GSB). The Third National Development Plan of Zambia (TNDP) has emphasized the responsibility of the GSDP for irrigation farming in the Valley.

8. No document is known to me which tries to identify the strategy of the Project for the time being, after it became apparent that the original concept could not be followed. It seems as if all concerned parties have accepted the GSDP as an independent institution with a team of expatriates, which implements its own plans and ideas, instead of considering itself responsible for providing governmental officers, active in the Valley with means and advice.
9. The idea is, to make the various schemes independent of outside aid so that the participants will be able to run their schemes themselves. The Valley Self-Help Promotion Fund, just being registered as a society, is considered as kind of independent Development Bank, which can support people's plans, if these are likely to be economically self-sufficient.
10. One of the major corner-stones of the thinking and strategy of the Project today was the turning over of the decision-making of Siatwinda Irrigation (SPIS) to the Farmer's Executive Committee (FEC). Before 1976 the scheme was run by a manager and an agricultural extension officer. Since the farmers have been managing their own affairs, the scheme has become more and more successful. Nowadays SPIS is the most successful part of the Project and a model for irrigation farming for the whole of Zambia.

3. Conclusions on the Terms of Reference

3.1 Basic Needs

1. It is very difficult to assess whether activities are meant to satisfy the basic needs of the (poor) people, or rather those of the elite. No objective criteria can be applied. As I understand it, the "basic needs approach" involves at least 4 different aspects:
 - A) Who decides what form the activities are to take?
 - B) How are the people being approached?
 - C) Who benefits from the activities as producers?
 - D) Who benefits from the activities as consumers?

2. to A) Who decides?

This is very much a question of the people's participation and the legal structure of the work. This aspect will be dealt with in the next chapters. The matter to be discussed here, relates more to the awareness and sensitivity of the staff: Most of the staff are not very much concerned about the question of how to find out the basic needs of the Tongas. There is a general feeling in the team that development is mainly a matter of introducing new ideas from outside. To me many of the project's ideas seem to be imposed on the people. The most extreme cases are the projects of "intermediate technology". It cannot even be claimed that they respond to a felt and expressed need of the Tongas; on the contrary their origin is due to the exploitation of an easy development potential, which is only too obvious for an expatriate. In fact the whole structure and history of the project makes it very difficult to follow a basic need approach. The starting point itself, the introduction of irrigation farming, was a strange idea to the Tongas. Also governmental structures are in most cases not easily geared towards meeting the expressed needs of the people, but to implement plans from the top to the bottom. Finally it is very difficult for expatriates to stick to a basic need approach, because they know very little about the people, their feelings, lifestyle, real problems and fears. It is very hard for them to communicate with the people in an appropriate way. The expatriates have come to Zambia as experts and not as pedagogues. Their short contract periods of 3 years and their achievement-motives are the main constraints for implementing a basic need approach. There is definitely a strong need for a better preparation of the expatriates, before they leave their country. They should at least be made sufficiently aware never even to think that they might know what is best for the people, better than the people themselves.

When asked, the staff will claim that in most cases their activities are a reaction to requests made by Tongas. But the request of an individual or even a group cannot be considered as an authentic expression of a basic needs; I do not believe that this is the right method to determine basic needs.

3. to B) Method of work

In the long run there is only one way to make sure that activities are really geared towards satisfying a basic need: Are the people willing to invest their own money and labour into the activity? As long as you approach the people as someone offering aid, they will respond with the need for it: If they know, you come from an irrigation-organisation, they will want irrigation; if they know you have supplied water in an other village, they will refer to water, when asked what they need. As long as aid is given as aid and the beneficiaries of the aid do not participate in the economics of the scheme, there is hardly a chance that basic needs will be identified or the self-reliance of the scheme achieved.

The GSDP had to learn the hard way. Many mistakes were made, mainly with Siatwinda Irrigation. The area was levelled with big machines, and the massiv concentration of capital and European expertises created a feeling of inferiority among the farmers and the attitude that SPIS was a governmental project, and not their own. This attitude made the SPIS fail totally, until it was handed over to the farmers in 1976. The manager was replaced by the FEC, all employed labor was sacked, and the farmers had to clean the channels themselves. From this time on the scheme was much better utilised. The practice of the GSDP was to start projects from the top before asking the people to get organised, and run the projects themselves. The involvement of the people ex-post is not the right way to plan for basic needs

and self-reliance. But in general the GSDP always makes the people invest their own effort as well.

There are enough cases, where the principles of self-help were violated. Like the case of Chimonello, where the people's hopes for help were so high that the GSDP just had to involve itself. Incidents and remarks of staff members proved to me that the Project is not careful enough in its approach to future planning. Still the attitude of "help" and "aid" prevails, and the technical feasibility of activities tend to be more important than the economics of self-reliance.

This issue of planning for basic needs and the methodology of approaching the people will become essential in the near future, when the project will expand to Buley Malima and Gwembe Central.

4. to C) Who benefits as producer?

By far the most important activities are the irrigation schemes. The focus on irrigation necessarily means that the direct benefits will be limited to a very small fraction of the whole Valley population. Only about 100 peasant families are participating directly in the 2 irrigation schemes, not more than 1-2 % of all Valley-Tongas. The possibilities of increasing the proportion of participants are very limited because

- of the geographic distribution of water-availability (only farmers along the lake-shore or the few rivers are potential participants)
- of the techno-economical feasibility of irrigation (only in a very few cases is irrigation feasible, especially because there are hardly any chances for gravitation - irrigation)
- of the capital- and extension-intensity
- of the vulnerability of irrigation schemes to mismanagement, motivation and provision of marketing outlets, transport and availability of modern farm inputs
- of the fact that irrigation means a total departure from traditional farming and know-how.

The selection of participants in the various schemes is not really carried out according to the degree of neediness. Most programmes do not apply any criteria whatsoever. In the cases where there are criterias, the criteria for selection are very general like for instance the water supply programme. The staff seems to be unaware of the degree of stratification of the Tonga society. Because in their view all Tongas - even the richer ones - seem to be poor, they do not hard to direct their services to the poorest of the poor. In many cases the Project is supporting people, who do not actually need any support. For instance the intermediate technology is being given to persons, who are very well off and who belong to the powerful section of the society. Many programmes are geared towards the same beneficiaries, which means that one family benefits many times from the services, while other families do not benefit at all.

Those instances would not be so serious, if it were not for the lack of understanding from the side of the Project. Some staff members are even of the opinion, that the work should be concentrated on people who are "progressive", "willing to change" and "who make the best and most efficient use of the services". Fast and visible results and a vague belief in trickle-

down effects seems to be more important than the stated objectives. Experience with the development strategies of the last 20 years, which were strongly grounded in the "theory of growth-poles" and "progressive farmers", clearly indicate that this type of approach is not effective in tackling poverty and creating a just development.

There is a still further bias in the Project for creating an elite: The distribution of the irrigation land is not equal. There are some families who hold 2 and even 3 times more irrigated land than others. There are about 2 farmers who - by the standard of the Tongas - grew very rich through the irrigation; they were able to earn about K 4.000 a year. In other programmes hardly any clear cut regulations are applied to make sure that the benefits do not get appropriated by one individual only. These points of criticism are intended to influence the future thinking of the Project rather than to give a clear pictures of the past. In fact it must be mentioned that the work of the GSDP is really reaching down to the grassroots. According to Zambians there is hardly any other Project in Zambia, that is so directly involved with the people. I don't want to say that all participants are better-off, it has to be maintained that most beneficiaries are average poor farmers, who have managed to improve their lot a bit with the help of the project without having actually become rich by any standards or having been uprooted from their traditional society through the participation in the project.

One could even say that irrigation-farming can be totally integrated into the traditional society if it is complimentary and secondary to the dry land farming. In that case it can act as a substitute to the traditional river gardens (Jelele), which also had the function of supplying a constant flow of vegetables to the family during the dry season. For most of the farmers the irrigation is of secondary importance. If the role of irrigation as seen by the farmers at the present is to become an official policy of the project, far reaching consequences are involved. There is a conflict between dry land- and irrigation farming, which would then have to be solved in favour of dry land farming. It might have negative effects on the success of the irrigation schemes.

5. to D) Who benefits as consumers?

The vegetables being grown on the irrigated land still have to be considered as a luxury food. For the farmers they are purely cash-crops. They grow them for satisfying their cash-needs, not their subsistence needs. The question of course arises, whether the cash-needs belong to the basic needs. Most of the cash is still being used for school-fees, clothes, additional food and agricultural inputs. I would therefore maintain that the growing of vegetables is fully geared towards the basic needs of the people. The hopes that vegetables becoming more and more part of the own diet of the Tongas are limited, as long as they fetch such a good price on the market. More systematic attempts should be made to encourage the people to eat more vegetables.

Almost the same applies to rice. People are starting to eat the rice themselves, even if so far only 10 % of the harvest stays in the valley. It is not quite clear to me whether there is a labor competition between rice-growing and the growing of sorghum/millet/maize. If this should be the case, the cultivation of rice has to be seen much more critically.

My general impression is that the thrust of the whole Project is to increase the commercialization of the Valley. This is being achieved through the in-

roduction of cash-crops, supply of farm inputs, credit- and saving facilities, employment (R.W.P.), etc. All extension is geared towards this goal. May be, the basic needs of the Tongas are really geared towards the money-economy at this stage of development. But what is the project doing to make sure that there is also enough food available? If the supply side is not simultaneously taken into account, commercialization can easily lead to more poverty and hunger. More and more crops are being sold and exported out of the Valley, while food is only reimported when the prices have grown considerably. People might find that the money they received for their acre of cotton is buying less grain than they could have harvested themselves from the acre, if they had cultivated millet or sorghum instead of cotton. This is only one danger connected with commercialization in an underdevelopment economy, but it is the major mechanism of exploiting the farmers.

This practice of financing the development of the towns and industry by the inflation of the basic needs of the poor is prevalent at the present. Other dangers of commercialization refer to the uncertainty of the markets, vulnerability to transport, pricing policy of government and inefficiency of marketing institutions.

There should be conscious balance between fostering the cash economy and securing the supply of food. On the production side of the Project I think too little emphasis is being given to the improvement of the subsistence-crops. The Dry Land Farming Programme has tried to combine the growing of cotton and maize, which is a very worthwhile attempt; it has to be highly appreciated. But unfortunately the growing of maize was a failure, due to the weather-conditions and the high yielding varieties. Thus in reality this programme also turned out to be a pure cash-crop undertaking. No other attempt is known to me, where the Project tried to improve the production of subsistence-crops. But there is one other project-activity, which is very important to me and which to my understanding is one of the most valid activities of the Project as regarding the basic need approach. It is a project of the Credit Coop. and thus decided on, planned and run by farmers themselves. The Credit Coop. buys the grain produced in the Valley, mills it, stores it in the Valley, and sells it back to the farmers in areas of need.

This programme helps to keep the prices for staple food in the Valley down, avoids food shortages and transport bottlenecks and is a real service in meeting the basic needs of the people. We should encourage the Project and the Credit Coop. to go ahead with this programme, even if this could mean that they might face a conflict with NAMBOARD.

How far the services and the produced goods of the other programmes are geared towards the basic needs will be described in some detail later. Here I just want to remark on it briefly:

- The Gwembe South Builders have no impact on improving lowcost housing; their work is elite- and urban-orientated.
- The Craftsmen-Programme is in fact geared towards repairing and producing goods, which are actually used by the poor people. So far it is meeting the requirements for basic needs. But the planning and implementation of the programme is not very convincing to me.

I suspect

- the water supply to be elite-biased, because the wells are to be transferred into private property.

6. Summary to the Basic-Need Approach

- Because there is no direct participation of the people in the decision

- making process of the GSDP, expatriates are more or less deciding what is a basic need and what is not.
- The expatriate staff lacks awareness of the fact that they should not be the decide what is needed by the people.
- The situation will improve, as the schemes in which representatives of the people participate in the decision making process (V.S.P., Credit Union, SPIS), are taking over more and more activities.
- Even if the actual programmes are more or less in line with basic needs, there is a definite threat, arising out of a lack of clarity, planning, controll and awareness in the Project.
- The project has to be mor sensitive and careful when dealing with the people to prevent the motivation of self-help from being destroyed and a charity-approach of the people vis-a-vis the project from coming up.
- Tendencies to concentrate on individuals and groups which have proved to be open to charge should be avoided. Instead of helping a few people to a really high position, more people should be enabled to improve their lot at least a bit.
- More emphasis should be given to the improvement of food-supply to the people, either by improving subsistence yields or by marketing and selling food products to the people.

3.2 People's Participation

1. In my understanding of People's Participation, it involves three different aspects:
 - a) Who shares in the benfits of the Project?
(already dealt with)
 - b) Who decides on what?
 - c) How are the people being met: Education or Exhortation?

But here we eill only deal with the question: How far are the people involved in the decision making?
2. There is no formal representation of the people in the decision making process of the Project as a whole. All decisions are carried out by the staff.
3. Where possible, the GSDP has put the formal decision-making-power of the individual schemes into the hands of the participants. The 4 most important schemes are run solely by elected bodies of participants:
 - Siatwinda Pilot Irrigation Scheme (SPIS)
 - Siatwinda Credit Coop.
 - Nkandabwe Irrigation Scheme
 - Gwembe South Builders Coop. (GSB)
4. The participation of the people in Siatwinda impressed me very much:
 - The awareness of the need for self-help is very high ("If we don't help ourselves, nobody will")
 - The Farmers Executive Committee (FEC) functions well; it organizes all its affairs itself, even the most complicated matters (like marketing).
 - The FEC is very active in convincing other farmers to join;
 - The FEC does not restricts itself to the technical management of the Scheme, but works for the development of the whole area; it started the Credit Union; it wants to start a Housing Improvement Scheme; it wants

to tackle school leaver's problems; etc.

- The FEC is very much aware of it's own learning process and the history of the scheme; it puts emphasis on training and education.
- All work is being done voluntarily; they commit themselves "for the sake of development."
- The farmers consider themselves more advanced, because they have experienced that life is changeable; they have very high hopes for their future.

5. Since many of the people active in the FEC are also active in the running of the Siatwinda Credit Coop., the same degree of active involvement and commitment can be found there. Everything is run by the farmers. The Board, the Loans Committee, the Education Committee and the Executive Committee are functioning well. All work is also being done on a voluntary basis. They decided to send the treasurer for further training. The projects they have started with the savings, are very worthwhile:

- brick-making
- resthouse
- maize-mill
- rice-husker
- storeroom for maize and for trading local grain
- pig programme

6. Of course there are also problems:

- The commitment rests only on the shoulders of some 5 - 10 active and politically aware members;
- the activists are not yet confident that they are able to run the 2 schemes themselves; they still need the advice and help of the GSDP;
- there is still much to be invested into the education and motivation of the members.
- There is still a big need for further training of the Office Bearers.
- In spite of the good leadership, the economics of the SPIS is not very convincing.
- It is questionable whether the schemes can be run on the same basis / by the same people and in the same efficient way if they are extended.

7. Because the Project has managed to create such strong local leaders among the farmers, the work has been worthwhile.

8. But the way in which this has been achieved and the mistakes that were made in the past should not be forgotten. The lessons, which can be learned from SPIS, are:

- a) Giving the power to the participants,
- b) emphasis on education, motivation and training,
- c) always being present without too much interference,
- d) trying to understand and accept the people, even if their ways are very strange to us.

9. Nkandabwe Irrigation is also run by a Farmers Executive Committee. But in contrast to Siatwinda, no strong and active leadership has evolved from the peasantry. The FEC is not very convincing, but it seems to be appropriate. Since Nkandabwe is much smaller than Siatwinda, since the technology is more simple (gravitation irrigation) and since the scheme is less important to the participants (only 0.1 ha per participant; only one harvest) the FEC need not be as effective. A problem I see: elders are dominating the schemes, and there are some very powerful individuals among the farmers.
10. Valley Self-Help-Promotion Fund (V.S.P.) is an attempt to draw local people into the decision making process. Even if civil-servants are dominant among the members and representatives of people's organisation are a minority, an important step towards creating a local organisation has been made.
11. The Gwembe South Builders have been registered as a co-op, but actually the workers are not really able to run its affairs themselves. They only formally have the power. Especially the critical financial situation of G.S.B. made a real participation by the members complicated. Still, far-reaching decisions on staff matter have already been made by the members, which indicates that their understanding is growing.
12. There is no direct involvement of the participants in the decision-making in any of the other programmes. It is often very difficult, because like in R.W.P./Dry Land Farming the beneficiaries are only temporary workers and the programme is totally fixed.
13. In the different schemes like Water Supply, Intermediate Technology or Craftsmen Programme there are no criteria which force the people to get organized and to set up democratic rules. It would be advisable in relation to the Water Supply Programme for instance to set up clear cut criteria, so that only those requests can be considered, where the community of the users has organised itself by drawing up plans of how to finance the bore-hole, where to locate it, how to maintain it and how the labour is to be supplied.

3.3 The Prospects for Self-Sufficiency

1. There is no real concept and thus no plan either for making the individual schemes independent of outside aid or for a withdrawal of the Project from the area.
2. After 8 years work it is definitely necessary to start thinking about the future of the Project. Many new activities were spontaneously started in the last 8 years, so that a phase of consolidation is needed now.
3. As was pointed out at the Evaluation Seminar:
 - The Government is not prepared to fund individual project indefinitely. The life span of projects should be 5 - 10 years.
 - "Planning for withdrawal" is not a matter for the final stage of a project, but should be an integrated part of all activities from the very beginning.
4. Fortunately there is a growing understanding on the part of the staff that consolidation and planning have to take place now.
5. Consolidation means that instead of
 - starting new activities
 - or extending old schemesall efforts have to be invested into identifying and overcoming bottlenecks on the way to self-sufficiency and independence.

6. In order to find out the conditions of self-sufficiency, the following steps should be taken:
 - All services given by the Project or the government to the individual Schemes should be carefully recorded and - where practical - the individual schemes should pay for them.
 - Each scheme should submit a plan of the most urgent training requirements to the project. The emphasis in the next phase will be on training the office bearers.
 - The schemes should be left alone. Only in cases where they specifically call for help should the experts in charge visit the Schemes.
 - The experts should only act as advisors. They should not interfere with decision-making, even in cases where they think that wrong decisions have been taken. It is better for the people to learn the hard way than not learn at all. The experts should also refrain from implementing a solution, and leave it to the people themselves.
 - After a trial period (of this sort) the Scheme - representatives and the Project-Officers should sit together and carefully evaluate the experience made. On the basis of these discussions the next clear-cut steps towards independence should be taken.
7. The chances of Siatwinda Irrigation, Credit Union and of Nkandabwe Irrigation of becoming independent are quite good if the process is well planned and projects are really well prepared for independence.
8. The big question-mark for self-sufficiency of the irrigation schemes is marketing. The marketing problems can be a real threat not only to the independence of the schemes but also to the whole Project. So far the real size of the problem has not really been noticed. But it can very well be that the marketing will keep the whole project busy, especially after
 - extension of Nkandabwe from 5 to 10 ha;
 - a better utilisation of Siatwinda;
 - the take over of Buleya Malima.Because the marketing of vegetables is a very complicated and risky matter, there is a real danger that it will depend heavily upon expert management.
9. The other difficulty I see is the tendency to overburden the active leaders of the farmers with more and more responsibilities and jobs. They should be discouraged from getting too closely involved with the project. They should stay farmers, concentrating on the running of their schemes without associating themselves too much with the Project, so that they can take the side of the farmers in cases of conflict between the Project and the farmers.
10. The Rural Works - / Dry Land Farming Programme was designed as a Programme dependent upon a governmental budget; it can never become independent and was never intended to do so. In fact it is supposed to be run only for a limited time-span. There is no reason however, why in the long run the R.W.P. could not be taken over by the Rural Council, if efforts are made early enough to draw it even more into the planning and implementation of the programme and to strengthen the capacities of the Rural Councils. The D.L.F.- Programme will have to disappear at some point; "Independence" of whole programme according to its present concept will have been achieved, if it succeeds in enabling the participants to grow cotton, once they have gained

the starting capital through the money wages of the R.W.P. In so far the D.L.F.-Programme has already succeeded.

11. The whole concept of the workshop has to change. It is a pure serving-unit to the different schemes, with some odd training, some testing and some fussing around. There is no chance of making it independent as a self-sufficient economic unit. It should start some more effective and systematic on-the-job-training for village-crafts men, help them to settle down, train some mechanics for the irrigation-schemes to look after the pump-sets; it can then cease to function. The idea of the bio-gas should better be forgotten.
12. Exempt the schemes which can be given to the people themselves all other activities should be handed over to the respective governmental departments, once they have been prepared for the take over. If this is not possible - they should be stopped now. If there is no chance of these activities ever becoming independent or being run by the governmental departments, there is no point in continuing, because they absorb that manpower, which is so badly needed elsewhere in programmes that have some perspective of becoming self-reliant. This recommendation refers to the Water-Supply Programme the Pig-Programme, the Erosion-Controll, the Dry Land Farming and the Health Programme. In case the Project feels compelled to stay active in these field, it should not run any programme itself, but instead help the government to carry out it's programmes more effectively, strengthening the District Planning Capacities and helping to overcome certain bottlenecks.

3.4 Impact on the Social Structures

1. I am unable to make more than general remarks on the impact of the project on the Social Structures, since no research has been done on this subject.
2. There is a very fast development going on among the Valley Tongas. Proofs can be seen almost everywhere. The cash-economy with modernization of certain areas of life is pervading the traditional society rapidly. It is the intention of the Project to strengthen this tendency. There are actually only very few elements in the work of the Project, where slightly different directions are intended.
3. Because of this correlation, it is hard to say, which changes are due to the Project and which are due to other cash-tendencies.
4. In the Siatwinda area a real change is taking place, which focuses on the irrigation scheme. The Credit Union was one of the results of the irrigation scheme. The education-scheme and other activities of the F.E.C. and of the Credit Union have certainly given rise to new kind of confidence among the people of that area, which resulted in other self-help initiatives. The enthusiastic attitude of the people to the construction of the Kanchindu-clinic might partly be due to the signs of hope created by the Project's activities in this area.

3.5 The Role of the Expatriate Team

1. My criticism of the massive concentration of expatriates in the Project might possibly stem from a refusal to accept that there are no alternatives to expatriates in Zambia. I do not know how hard the G.M. has really tried to recruit African manpower, but it has been stated again and again that it is very unrealistic to assume that qualified Zambian manpower is available for the Project.

2. I do not believe that the only alternative to a project run by expatriates is to forget development work. It seems to me that there is a basic contradiction in the whole concept of the Project: How can one assume that a project
 - which is functioning because of the qualifications of 7 academically trained (expatriate) persons can become independent
 - if not even one qualified Zambian counterpart could be found in 8 years,
 - if not even one Zambian is sent by the Project to be trained to take over some leading positions afterwards,
 - if there is virtually no training content in any of the Schemes
 - if the work is not adjusted accordingly, i.e. if they don't shift to less ambitious programmes, which could be run by less highly trained Zambian personnel.
3. The real contradiction goes back to the very beginning. When it became clear that the Integrated-District-Planning-Approach through the "Co-ordinating Officer" had failed, a new strategy concerning counterparts should have been adopted. The ideology "we don't believe in counterparts" was appropriate to the original concept, but not to the realities of the GSDP as an organisation, implementing programmes itself.
4. It is high time to start rethinking,
the role of the expatriate team,
the concept of counterparts,
the manpower planning (own manpower supply by sending selected and committed Tongas for further training),
the training activities in the schemes.
5. There are a number of very critical points in the role of the expatriates, which give some cause for concern:
 - a) The expatriates have all the decision-making power, not only because of their expertise, but also in the legal structure. They dominate the staff-meeting completely. Their work is not being effectively controlled or guided by any Zambian body or institution.
 - b) The expatriates are an institution of their own: Beside the institution "GSDP", there is still the "Gossner Service Team" (GST); only the expatriates are members of the GST. The GST has it's own meetings, own budget, a Team Leader and an identity of it's own: The people in the Valley don't even know the official name of the Project; they identify the work of the Project with "Gossiner". The expatriates claim that in the meetings of the GST they never deal with Project Policy or Programmes but only with personnel matters or issues related to the Gossner Mission. In fact looking at the minutes of the Team Meetings I cannot quite support this point:
 - The Team Meeting takes decisions and advises the G.M. in all matters relating the expatriate personnel. The power to draw up job-descriptions and outline the basic qualifications of the expatriates rests according to the agreement with the Ministry. This power has to a great extend, been transferred to the Team, because the Ministry has failed to fullfil it's obligation. The Staff Meeting is normally merely informed about the decisions made. Matters of renewal are not even discussed at the Staff Meeting. All these personnel matters are essential policy matters for the Project.

- All matters which involve mission funds are decided by the GST alone. The Staff Meeting is only informed. No discussions take place.
- When the representative from the G.M. came to visit the Project, basic planning matters, which are central to the future of the Project, were discussed only with the Team.

The fact that the mission funds are now to be handled by the VSP can be seen as a certain improvement. But the basic critical fact remain: The expatriates are not totally integrated into Zambian structures. According to the agreement they should be "under the exclusive direction of the Government of Zambia or the agency to which they are assigned." In the present situation this can only mean: The expatriates are totally subordinated to the GSDP. Most of the expatriates are not even aware of this legal set up; they believe that the G.M. and the Team has authority over them. The expatriates do not believe that the coexistence of their GST and the GSDP is a critical issue.

To my understanding this indeed is a critical point. I strongly advise GM to cancel the idea of the Team altogether. There should be no Gossner Service Team nay more, but only the GSDP. The reasons are:

- The expatriates are part of the Zambian governmental set-up. They should recognize their legal status.
- They should accept that in all matters they are solely responsible to Zambian institutions. If the work shall be permanent Zambians have to identify themselves with the work, because the expatriates are sure to leave sometime. This can only be achieved if the decision-making structure is completely Zambian.
- On some issues the Zambians have different opinions from the German Staff, especially in matters of the length of contracts, the consolidation of the work, and the attitude towards the Zambian Government. The different opinions are not outspoken and thus not recognised. But the conflict-issues are vital for the future of the project. They can only be discussed, if they are put on the agenda of the Staff-Meeting and if the Zambian Staff has the feeling that they can participate equally in the decision-making. As long as the Team-Meeting feels responsible for these questions it is not realistic to assume that the issues can be freely discussed.
- The expatriate staff is well organised through the Team-Meeting, but the Zambian staff not. It cannot be avoided that an unequal access to information and an unbalanced power structure will result, because it cannot be avoided that many issues of the Staff Meeting have already been discussed in the Team Meeting.

When discussing these points, the expatriates refer to the Agreement, which provides for the institution of the Team and the Team Leader. But we have to keep in mind that the original concept of the Agreement was completely different from the reality of today. In the Agreement the term "Team", means a team of advisors to the District Co-ordinating Officer, directly under his direction without any power independent from him.

- c) The expatriates not only work together, but also live together. Their dependency upon each other in social matters, their isolation and the closed camp-situation makes it a matter of vital importance to avoid all conflicts. It seems to be very difficult for members of the Team to criticise each other's work. The basic strucuture of such a situation leads

- an inability to evaluate and to discuss the work, to develop concepts and to assess strategies,
- a separation of isolated individual areas of work and a disconcern about "somebody else's business".

As I understand it, such a situation is absolutely fatal for any development work. I believe that the basic principle in development work is "avoid harm", since I know that more efforts have failed and caused harm than have been successful and useful. If this is so, the most vital point for all development work is the ability of self-criticism.

Even if the individual expatriates might have the ability of self-criticism, the institution "Team" is structurally lacking in this ability.

d) Most of the expatriates are technicians. They have been selected because of their technical expertise. Thus the whole work is dominated by the attitude that the most important problems are technical ones.

The problems of motivating, organising, conscientising, educating and training the participants are considered as secondary, not so difficult and less urgent.

For me, this is a wrong assumption and a misconception. The lessons from Siatwinda have shown how essential it is to work with the people. It was only because the extension officer at that time was able to approach and understand the people adequately that the scheme suddenly succeeded.

Looking at the different activities of the Project, I get the impression that the emphasis is too strong on "trials": vegetable-trials, soyabean-trials, bio-gas-trial, soil-survey-trials, turbine-trial, pig-trial, etc. After 8 years of work I would imagine that some messages should be clear now and ready to be communicated to the people. Consolidation to a certain degree means putting an end to trials. "Trials" is purely a technical matter; it is what the technicians have learned. If technicians really have a bias to trials, perhaps they should be replaced by Community Workers in the consolidation phase of Project.

It is interesting to note that the Zambians seem to have different views on that matters from the expatriates. The Zambians complain that each time an expatriate gets replaced the new man introduces new ideas and starts new activities, while some old activities are not followed up adequately, get omitted and forgotten. They plea for longer contracts and more consistency in the job-descriptions. The expatriates vote for just the opposite: replacement after 3 years and flexibility in job-descriptions. They claim that for the progress of the project it is necessary to get the production of new ideas going.

Obviously two completely different terms of judgement are being applied: while for my Zambian dialog-partners "progress" is measured by the actual change of the practices and thinking of the people, I suspect the expatriates to believe more in visible, quick and material growth.

6. My conclusions on the role of the expatriate team: It is possible that in the past the success of the Project depended very much on the structure of work allowing so much independence, creativity and flexibility for the expatriates. But for the phase of consolidation
 - a more formalised decision-making structure and planning is necessary,

- the expatriates should be integrated into a local institution,
- directions should be given by an effective decision-making body,
- evaluation and ability for self-criticism should be structurally built-in by an effective control mechanism,
- the emphasis should be on enabling-activities rather than carrying out trials.

The technical expertise of the expatriates should be more strongly complemented by pedagogical qualifications.

4. Comments on Some Project Activities

4.1. The Agricultural Approach in General

1. The focus of the Project is on irrigation farming. The involvement of GSDP in Dry Land Farming (D.L.F.) started only some years ago; it is a secondary activity for the Project, not very much integrated into the Governmental Planning for the Valley and is designed in such a way that it has to fade out at some time. The question arises whether the emphasis on irrigation farming is the right approach for the Valley.
2. The focus on irrigation has arisen out of the history of the Project. The Third National Development Plan, which has now been completed the priority of irrigation for the GSDP.
3. Even if basic decisions as regards planning and implementation have been taken in favor of the irrigation-approach, there is still an option for D.L.F. This is the reason why the agricultural approach can still be discussed.
4. The Evaluation-Seminar also discussed this issue. Many points against and in favour of irrigation were made:
 - a) against irrigation
 - Irrigation is too capital-intensive. To bring one hectare of land under irrigation, the initial capital input in the case of Siatwinda was about K 4,000. According to my calculations, the annual cost of water for one hectare of land comes to K 300/-. This high investment and the resulting high recurrent costs, automatically necessitate a very intensive utilization of the land with sophisticated agricultural technology, high case inputs and the cultivation of cash-crops only.
 - The poor farmers are not used to irrigation-farming. The introduction of irrigation with the many accompanying technological changes represent a total departure from their traditional knowledge, crops, thinking and life-style. To get an irrigation scheme running effectively, will be a very slow process, the risks of failure are very high and the expenditures on extension trials, management and education are necessarily very high too.
 - Because of the high costs involved, the economics of an irrigation scheme are very much dependent upon the degree of utilisation. Only if all the land is used with maximum capacity, can the scheme be economically successful.
 - The schemes are dependent upon ready available markets, especially vegetables. Vegetables are in fact the only product that are economically feasible for the scheme. But marketing perishable products like vegetables is a very complicated and risky undertaking.

- The schemes will be very dependent upon the efficient provision of many sophisticated services and goods (like diesel for the pump-sets; repairment and spares for the pump-set; high quality seeds; other agricultural inputs; etc.). In a remote area like the Gwembe Valley it is very unlikely that a season will pass without a major supply bottleneck.
- It is hard for an irrigation scheme to become self-reliant, especially if the present Zambian water-rights are not changed: Water-supply is a purely Governmental activity; While the government has to supply the diesel for the pump, the farmers have to pay a water-fee to the government. If the people are not themselves responsible for the canals and the supply of the water, they will not take sufficient care, and will always try to avoid paying water-fees. Breakdowns are not avoidable, as long as the supply of water depends upon the good-will of civil-servants in far-away offices.
- Only a small fraction of the population of the Valley will ever have the chance to participate in an irrigation scheme. That is the reason why it cannot be a model for fighting poverty in the Valley and why it does not lead to economic growth with distributive justice. Irrigation will only create a special privileged strata of farmers.
- Irrigation schemes are rich enclaves in a poor environment, with little impact on the development of the surrounding farms and social community. There is hardly any resemblance between the irrigation-technology and D.L.F.; thus the "trickle-down effects" will be weak.

b) Points in favour of irrigation

- Because rainfall in the Valley is very uncertain and irregular, there is no alternative to irrigation.
- Irrigation schemes foster economic growth; they produce more and different agricultural products than D.L.F.
- Irrigation schemes are development poles; through spread-effects and additional services to the communities, they might have a strong impact on the economics and social life of the area. The social and economic changes will be more rapid, even if only few people participate.
- The irrigation schemes of GSDP are models for the whole of the country. If irrigation cannot succeed here, there will be no chance anywhere. Because irrigation will have to play a major role in the development of Zambian agriculture, the schemes are a kind of testing-ground.
- There are no agricultural programmes in existence which can involve all the people. If priorities have to be set anyway, why not concentrate on the most modern agricultural technology and on some of the most progressive farmers, who are willing to irrigate.
- Enough work is being done by other governmental departments on Dry Land Farming; there is a division of labor between GSDP and other governmental departments in respect of the agricultural approach favoured by them for the Valley.
- Irrigation is a very slowly maturing economic investment. We cannot expect to get any good economic results before 15 - 20 years.
- It is very difficult to design viable programmes for improving the Dry Land Farming. The costs for finding and implementing these improvements will be high, while the results will be minimal. The radical change brought about by irrigation is much more promising than the slight

improvements that can be made on D.L.F.

5. To summarize the discussion:

- The points of view against irrigation emphasize the importance of the economics of the scheme as a precondition for self-reliance, and they put a high value on "development with distributive justice".
- Most of the points in favor of irrigation derive from "modernization theories", meaning that it is most efficient to concentrate on the readily available potentialities for development and on those people, who already have a favourable attitude to the idea of progress. The basic assumption of these theories is that growth will trickle down to everybody in the long run.

6. In accordance with the results from the Evaluation-Seminar, the following conclusions can be made:

- a) A too one-sided emphasis on irrigation gives reason for concern. Some kind of balance between irrigation and Dry Land Farming has to be maintained. The changes made in both fields must be complimentary to each other. They must be integrated into a common agricultural strategy for the whole of the Valley.
- b) The irrigation-schemes must have a chance of getting independent and economically viable within a well defined time-span.
- c) To achieve self-reliance of the irrigation schemes, clear-cut plans and targets have to be developed for them.
- d) The marketing-problems must be solved. If possible, all irrigation schemes of the valley should co-operate in the marketing of their vegetables.

7. My personal opinion even goes beyond these recommendations:

- I would not advise the GSDP to expand Siatwinda Irrigation.
- I would not recommend the launching of any new irrigation schemes (except for very small ones using animal or manpower for water-lifting).
- The emphasis should be put on
 - the social and economic consolidation of the present irrigation schemes,
 - preparing them for independence
 - integrated planning for all agricultural work done in the Valley.

8. I very much doubt the truth of the allegation that an improved version of DLF would be no real alternative to irrigation. I am afraid that the emphasis on irrigation is mainly due to the fact that much more spectacular results can be achieved with this method. Furthermore: It is easier to administrate and institutionalise schemes than programmes (for D.L.F.) and to avoid the dialogue with the people which would necessarily be involved in an Dry Land Farming-Programme.

4.2. Siatwinda Pilot Irrigation (SPIS)

1. The degree of social mobilisation, the general awareness of the Farmers' Executive Committee (FEC) and the impact of SPIS on the community is in some respect very impressive, as I have pointed out elsewhere.
2. In spite of the high organisational standard of the Scheme, the economics are not very satisfactory. The following figures on the cash-income of the Scheme's

marketing activity were given:

	1976/77	77/78	78/79
Rice	887	2.371	4.416
Vegetables	5.254	19.201	10.372
together	6.141	21.572	14.788

It is not very clear which percentage of the total harvest from the irrigated land was actually sold through the channels of the Scheme. My estimates are that not much more was produced than sold according to these figures, because the local market is negligible and farmers claim that the crops in the schemes are only for cash.

3. If we assume that in principle the given figures give a general picture of the economic success of the SPIS, we derive the following indicators for 1978/79:

average income per ha: K 672/-

average income per farmer: K 246/-

income of most farmers with 0,2 ha: K 135/-

Compared to cotton, which gave a return of K 976/- per ha, irrigation farming didn't do very well. If we still consider the costs for inputs per acre, which are about K 150/-, most of the farmers have gained only K 60/- from their irrigated plots.

Taking into account the K 300/- per ha for water (which are being paid by GSDP), the scheme is running on deficits. Only if the Government is willing to subsidise the water-supply, can the Scheme continue.

4. The following reasons for this low economic success were given to me:

- The main bottleneck is marketing: 900 kg of tomatoes and 2.000 kg of onions had to be dumped last season, because they could not be sold.
- Only 7 ha from the total 28 ha are actually planted with rice during the rainy season;
- Losses occurred due to the fact that high quality seed was not available in time.
- Only about 35 % of the participants achieved a yield per Acre, which is being assumed as "optimal" under the present circumstances.

5. This low degree of utilisation of SPIS in spite of the ability of the farmers' leadership shows clearly that the economic feasibility of irrigation is very sensitive to many complicating factors, which cannot be controlled easily.

6. Of course, much can be improved by attacking certain technical bottlenecks and solving the marketing problems. The idea of exploiting potential markets better by supplying out-of-season (through early-planting programmes; conservation; processing) is very good. But this approach, again, will take many more years of experimentation by expatriates, meaning additional dependency of the Schemes upon outside help. I am afraid that part of the low utilisation of the irrigated land is due to the conflict between D.L.F. and irrigation in farm-management.

7. The farmers complain that their ability to care for the irrigated plots is limited because they have to put priority on their Dry Land Farming. Since the irrigation only provides cash, while DLF still has to supply all the staple foods, they have to pay more attention to their agriculture outside the scheme. The risks of the Dry Land crops failing are higher, and the consequences more serious. Because of this conflict the participants want more irrigation land in order to be able to concentrate completely on irrigation farming and to abandon their DLF. So far most of the farmers of the SPIS crop 1/2 Acre irrigated land, some have 1 Acre, 3 farmers are cropping 2 Acre and 2 even 3 Acres. FEC favors an extension of the scheme to a size that would allow each farmer 1 ha irrigated land.
8. There are plans to expand the irrigated area of Siatwinda up to 100 ha in the final stage, starting with an additional 48 ha. I don't believe that this expansion is a good idea:
 - So far the Scheme is not economically feasible. Before it has been proved that a better economic result can be achieved. I don't believe that the time has come to expand.
 - If it is already difficult to mobilise the potential of the present area and farmers, it will be even more difficult to do so when the acreage is twice the size and when there are many more participants, most of which are totally inexperienced with irrigation farming.
 - There is a real danger that the marketing problems of an even bigger acreage cannot be tackled.
 - I personally oppose the idea of creating a stratum of full-time irrigation-farmers because they may become very rich due to high governmental investments into their farms, while the rest of the population lives in misery. Nothing will prevent these farmers from employing wage-labor to run their irrigation farms, while they themselves still might continue their Dry Land Farming.
9. I would favor a strategy, in which each participant of the Schemes only cultivates 0.1 - 0.2 ha of irrigated land as a kind of insurance against famine and to satisfy the cash-needs, while the emphasis should be placed on improving the situation of Dry Land Farming.

4.3 Rural Works Programme/Dry Land Farming

1. The main emphasis of the D.L.F.-Programme is on the introduction of
 - cotton and maize in rotation
 - with modern agricultural methodsby supplying a selected number of farmers with a cash-income through their participation in the Rural Works-Programme (RWP). Altogether about 60 people have participated in this programme for more than 1 year. Most of these participants have accepted the D.L.F.-package.
2. The idea is to make the participants save 25 % of their cash-income from the R.W.P. and to supply them with high-yielding seed, partly financed by their savings, partly by additional credits. While the total supplied inputs for 0,5 ha cotton, amounts to expenditures of K 43.20, the costs of the 0,5 ha for maize was as high as K 54.00. In matters of return just the opposite

took place: The average return from 0.5 ha cotton was K 488/-, while the participants gained hardly any returns at all from their maize.

3. The shift from traditional grains like sorghum and bullrush-millet to a rotation of maize and cotton is very problematic. The total acreage under grain was reduced, while at the same time, the vulnerability of the subsistence-crops immensely increased. This is due to the fact that on the one hand maize is much less resistant to drought, while on the other hand especially the high-yielding varieties of maize are especially vulnerable.

While cotton as a cash-crop is doing very well in the Valley, the maize has often failed almost completely. In spite of the good cash-returns from their cotton, the people had less to eat, because staple-foods had to be imported into the Valley and was very expensive. This being the basic situation of the Dry Land Farming, the following major problems should be tackled:

- To find some legume or some other, more drought resistant maize-seed, which can be grown in rotation with cotton;
- to check the growth of cotton to make sure that a rotation with legumes or maize can be maintained, and that the balance between food crops and cash-crops is still guaranteed.
- To take care that a sufficient flow of grain is available in the Valley and that the people do not suffer from the rise in prices.

4. The DLF-Programme is not able to deal with these problems sufficiently. Because of its dependence on the RWP, I don't see how it can ever become independent of the Project. GSDP should try to find solutions to the above mentioned problems encountered by the DLF, instead of continuing indefinitely to run a programme which is completely dependent upon the initiative of the Project. Some very promising ideas have been brought up by GSDP, like the introduction of soya-beans on a rotational basis with cotton. Should this attempt prove to be viable, all efforts should be concentrated on convincing farmers and the agricultural extension service to grow soya-beans and to develop the necessary supply and marketing facilities for soya-bean production. This kind of programme makes much more sense to me than the present DLF-Programme, because of its long-term impact.

In my view, the failure of the HYV-maize indicates the failure of the whole programme, which, in my opinion, should be discontinued.

5. If the DLF-Programme is discontinued, the RWP, as it is being run at present, should also be abandoned. GSDP could help the Rural Council to design a RWP, but the Project should not run it any more itself.
6. I very much appreciate the involvement of the Project and the Siatwinda Credit Union in the buying of rize and maize, the milling, storing and selling. As I pointed out earlier (see 3.1.5.) this is a very worthwhile attempt to fight the hunger in the valley.
7. There are still many untapped possibilities to improve the DLF. Most of them refer to husbandry practices, more resistant seeds, intercropping system, farm-mechanisation and other water-conserving methods like organic fertilisation, tie-ridging, etc. I have the impression that this whole area has been neglected in the development efforts of government and has not received much attention from the Project either.

4.4. Buleya Malima

1. The Project has agreed to take over from the Government the Buleya Malima Irrigation Scheme, which encompasses 62 ha 7 ha of which are used as a governmental orchard. Since the Project has been well described in a report by Mr. Krisifoe (18. Sept. 79), I shall restrict myself to some specific points.
2. The Scheme is in an awful state. I am afraid that getting it running again in a satisfactory way will be a very big problem. It will be a full-time job for at least one very committed staff-member. I don't think the scheme can be run by the suggested team of the Co-operative-Advisor, the Agriculturalist and the Technician of GSDP. Either the Co-operative Advisor or the Agriculturalist should be posted in Buleya Malima, fully responsible for the scheme, while he calls the services of the colleagues as needed.
3. The area utilised has to be drastically reduced, otherwise I don't see any chance to get the scheme run by the farmers themselves. At the beginning the membership should not exceed 100, and each farmer should not hold more than 0.2 ha. A Scheme of this size should utilise the irrigated area in one corner, while it still has to be decided how to utilise the rest of the land in the scheme.
4. I personally see Buleya Malima as a big threat to the success of the whole project. The extent of the problems might be greater than the Project can actually handle. Before starting any activities in Buleya Malima, a basic study should be made, on how acreage under irrigation could be reduced, what to plant and how to market the produce, which new investments have to be made, to get it run on a lower scale and how to utilise the land which is not to be allocated to the participants.

4.5 Summarizing Comments on Various other Programmes

1. Valley Self Help Fund:

The idea is very good and in fact overdue. I am very happy that the suggested constitution has been changed to allow any member to become an office-bearer. By this alteration V.S.P. can become a self-reliant institution, legally independent of the GSDP. The staff should take more pains to try to consider VSP not only as an instrument of the Project, but as an institution of the Valley. Particular the idea of inspiring people and institutions from the Valley to send requests for funding to VSP has to be strengthened.

2. Workshop: a) I don't consider the bio-gas a promising project, because

- it doesn't respond to a real need of the Valley, since there is still enough traditional energy available in the form of wood;
- it is too costly for the poor people;
- it is not viable to most of the people in the Valley, because only very few own enough cattle;
- it is not integrated into an agricultural programme to improve cattle-keeping and application of manure I suspect the bio-gas of being uneconomical under the present conditions of cattle-keeping in the Valley.

- b) The turbine as another project of intermediate technology does not seem very important to me. It's impact will be limited to the running of one individual maize-mill. However I don't agree at all to the idea of handing over the turbine and the maize-mill to an individual. The case of Pedro's workshop should have taught us the lesson that there is a danger that individual entrepreneurs will overcharge the customers. The maize-mill should be run by the FEC of Nkandabwe.
- c) I appreciate the Craftsmen-Programme in 2 respects: The products they are geared to (simple repair-services to the poor) and to the type of training (on-the-job-training with limitation to single products). This is the kind of training which is cheap, quick and serves the people in the villages directly. With the same resources far more people can be trained. However, it would be an exaggeration to talk about a real craftsmen-programme. The activities are not really well planned; they are more or less incidental. There is no definite budget, for instance with set targets about the length of training, number of trainees and steps to settle them down in their villages.
- d) The more sophisticated on the job training with engines and cars does not convince me either, because it is unsystematic and without any plans to guide it. The workshop should start to record the different services rendered to the various Schemes. Mechanics should be systematically trained till they are able to supply these services independently and should then be seconded to the Schemes. In the long run the workshop will cease to function. A plan has to be made to prepare these different steps.

3. Nkandabwe Irrigation

There is not much to say to Nkandabwe. Since it is irrigated by gravitation, the economics of the scheme are much more favorable in comparsion to Siatwinda. The only real problem seems to be the question of marketing, which has to be solved simultaneously with Buleya Malima and Siatwinda.

5. The Organisational and Legal Structure of the Project

- 1. G.M. should never stop considering, whether it could not be possible to return to the original goal of the agreement, i.e. restricting its role to the strengthening of governmental departments in the Valley. This could be achieved by advising the respective governmental institutions and by helping to plan for an integrated-area-approach.
- 2. This goal can be approached by the GM in several different ways:
 - locating a G.M.-planner, who is in charge of the Planning of the Gwembe Valley, either to the District or to the Province; he should concentrate on the G.S.D.P.;
 - restricting itself to a purely advisory function, when it comes to the extension to Gwembe Central, while leaving the approach of the GSDP as it is;
 - changing GSDP more and more to an advisory service for the governmental departments active in that area, while the Schemes become more and more independent.
- 3. There are evidently chances of things developing in the direction mentioned above, as plans for the decentralization of the Zambian development planning

process are currently being discussed. The District will certainly be in a more powerful position as regards the coordination and planning of development.

4. The following suggestion was raised during the Evaluation Seminar:

"The G.M. should persuade the Central Government to appoint a District Coordinating Officer for the Gwembe District. His job would be to determine the future function and activities of the G.S.D.P."

Since this position is explicitly provided for in the agreement, the Gwembe District might quite possibly be one of the first Districts in Zambia to have this Officer appointed.

5. There are serious defects in the present organisational and legal structure of the Project. The remodelling of the whole decision-making process should have overall priority for the immediate future.

6. Because the Gwembe South Development Committee (G.S.D.C.) and its Executive Committee (E.C.) are not operating effectively, there is nobody in an above the G.S.D.P., to make the policy, guide the Work, coordinate it with other government activities and control the Project. All the power is in the hand of the Staff-Meeting, this being the only functioning decisions-making body. This means that legislative, controlling and executive functions are held by the same people. This is basically undemocratic. Further more it leads to an isolation of the Project within the state development planning and makes the GSDP to a state within the state.

Moreover: Coordination with other governmental departments is arbitrary; it is a matter of the good will of each individual staff member. Lack of control and of policy-formation from outside of course also means a lack of the built-in criticism needed to justify the work and evaluate the success.

7. In addition to this point all the critical remarks I made in relation to the role of the expatriates are valid, and should be considered if the projects to be reorganised. The power of the expatriates has to be reduced and checked.

8. The Project has a direct power link to the Central Government. It can bypass the various local, District and Provincial bodies. The success of the Project is partly due to such a privileged situation, which cannot be maintained, when the Project is Zambianised.

9. The main recommendations for remodelling the structure of the Project refers to a reform of the G.S.D.C. and its E.C. These two Committees should be replaced by a new Committee, which would work more effectively. The reasons, why the present G.S.D.C. has been ineffective are:

- the Committee is too big;
- certain committee members were members ex officio; they were not sufficiently interested in the project
- it was a Sub-Committee of the Gwembe District Development Committee; since that Committee has to discuss the Programmes of the GSDP anyway, in the eyes of its members the G.S.D.C. was no more than a repetition of the work of the GDCC; the meetings were not attended with much interest.
- there are very few representatives in the GSDC, who have a vital interest in the work of the GSDP and who could express critical views; most of them don't know the work and are not directly effected by the Project; people the Schemes are not represented in the GSDC.

- No serious attempts were made by the Project to get the GSDC and most of it's members really involved in the Project and the decision-making. This could have been done by introducing controversial issues, by presenting critical statements, by supplying evaluation-reports or by leaving really important decisions to the GSDC; a Committee is always as good as the Secretary wants it to be.

10. I suggest a new Committee,

- which has a workable size (not more than 10 members)
- in which half of the members are representatives of the different schemes,
- which gets really involved into the decision-making process by the Secretary;

11. A small ad-hoc-sub-committee should work out a practical suggestion for the membership and terms-of-reference of the new Committee. All the power of the present Staff-Meeting should be transferred to this Committee. The Staff-Meeting will only have to function in order to coordinate the practical work, carried out within the limits of the decisions taken by the Committee.

12. Besides the Committee and the Staff-Meeting I propose a third Institution: the Secretariat. The Secretariat should consist of

- the Project Administrator
- the Project Secretary
- the Planner.

The function of the Secretariat would be to prepare the meetings of the Committee and to make sure that the decisions of the Committee are being implemented by the Staff. By definition of it's functions it should be clear that the Secretariat has a certain degree of authority over the Staff. In cases of disagreement the issue should be brought before the Committee and both parties (the involved Staff-member and the Secretariat) should have the right to put the point on the agenda of the next Committee-Meeting. The Staff-Meeting would have the right to call a meeting of the Committee any time.

13. I am aware of the fact that the present Staff is very much opposed to the suggested Secretariat. But I still want to propose it, because it seems very necessary to me, if a real change is to take place. Without the special powers of the Secretariat

- there is no guarantee that the Committee will really get involved into the basic decision-making process,
- the power of the Staff and the Europeans cannot be challenged,
- the Planner has no real authority behind his recommendations and critical remarks.

It will be the conflicting interplay of the

Committee
Secretariat
Staff

that will give the Project a driving force and promises real countervailing powers.

14. Within the Secretariat and perhaps for the future of the whole work of the Project, the role of the Planner will be decisive. On the Evaluation Seminar everybody agreed on the necessity of the planner. However it must be clear that a Planner can only be effective within a certain set-up.

- The Planner has to have a certain independence vis a vis the executive Staff.
- He must have a Committee, to draw up the terms-of-reference for evaluation and planning.
- Planning must have a certain authority over the Staff to enforce the implementation of the plans.

Because none of the above mentioned preconditions exist in the present situation, it will only be worthwhile to appoint a Planner to the Project if the decision-making structure is altered (in the suggested way).

15. The Planner should not live in the Nkandabwe Camp, to avoid the dependence upon the Staff through the close social contacts. He could be stationed either in Choma (with the PAO's office) or in Gwembe (with the District). Because he would be seconded either to the Province or to the District, it would be a good idea to have him stationed there anyway. Furthermore the Planner should not only be responsible for the G.S.D.P., but for the whole of the Valley. This is necessary because the Planner would also have to plan for the extension to Gwembe Central. In addition to this he should render some advisory services to the respective Governmental Offices too.

16. It is unlikely that this Planner can be recruited within Zambia. In that case he could be an expatriate. But G.M. should try to find out whether it would not be possible to recruit an African (farmer student) in Europe for this post, preferably a zambian. This would be a contribution to counteract the "brain-drain".

The expatriate Planner should not have a contract with G.M. Some other sending-organisation of Europe should be asked to supply this Planner (like DÜ, DED, etc.).

17. The Evaluation Seminar suggested that the PAO and members of the Staff should try to work out a plan, including where to post the Planner, to whom he should be seconded and which responsibilities he should have.

18. Of course all expatriate Staff will be subordinated to the decision-making structure of the GSDP. They will be totally responsible to the Secretariat and the Committee. The team will no longer exist as an institution. G.M. cannot give any directions to the expatriates concerning the work; it only may deal directly with the expatriates in matters concerning their contracts.

19. This proposed new structure does not need any alteration of the agreement. It is in fact the attempt to stick to the agreement and to really implement it.

6. Budgets, Costing and Administration

1. All the funds of the Project-Budget have come from the Central Government. The funds received from the FKA (K 46.000) in 1979 were the only exemption.

2. Alltogether the GRZ has invested about K 550.000 so far into the GSDP. Another K 120.000 has to be added for the construction of Siatwinda Irrigation Scheme.
3. Besides official Budget, the Team has received from time to time small donations from overseas for specific programmes. These donations were handled by the Team and didn't enter the books and Budget of the Project. For instance money was raised in Germany for drilling-equipment for the water supply programme (K 5.178). Another instance secon-hand clothes were sent for sale; the receipts were invested into Kanchindu-Self-Help Clinic. The total amount of such donations is unknown, but my estimates are that it didn't exceed K 10.000 altogether. Now these activities will be handled by V.S.P. As a Governmental Project all incomes and donations have to be transferred to the Central Treasurer. To avoid this, V.S.P. was founded.
4. It is very difficult to say whether the total expenditures of the Project justify the results. A cost-benefit-analysis should take into account that on top of the invested K 585.000 through the budget, about DM 2.400.000 were spend by G.M. on personnel.
5. Looking at the Budget, it immediately becomes clear that quite a high percentage of the expenditures are "overheads", especially "km allowances" and "Salaries". It is impossible to say how much has actually been invested so far into the various scheme and what the running costs are, because there is no possibility to split up the overheads according to services rendered to the various schemes. The first step towards "planning for consolidation" will be to introduce some kind of simple cost-accounting and recording-system which makes this split-up possible.
6. Over the 9 years the following total figures have been budgeted for the various schemes:

Siatwinda	K	96.010	(plus K 120.000)
Nkandabwe	K	16.449	
Kafwambila	K	16.181	
Rural Works Programme	K	67.883	
Dry Land Farming	K	18.432	
Workshop Craftsmen Programme	K	71.192	
Various others	K	46.468	
(like Water Supply, Health, Pigs, etc)			
overheads			

Of course no direct conclusions can be drawn from these figures. But it is interesting to note that Siatwinda Irrigation, the Workshop and Rural Works Programme were the most expensive Schemes. While it is clear where the money went to in the cases of Siatwinda and R.W.P., it is not so clear at all in the case of the workshop. Since the programmes of the workshop are minor, most of the money was spend for overheads (lorry, diesel, repairs, driver, casual labor). It is very necessary to open up special accounts for these expenditures and budgeting them accordingly, instead of summing them up under the "workshop".

7. The conditions under which the funds get administered, are very difficult. In comparsion to other governmental departments GSDP is still in an privilidged situation. Sales are only be made through a complicated system of approval by various officers. The Local Purchase Order of Government do not get accepted any more by most companies, because Government has failed to pay in many instances. But Companies are still much more willing to sell to GSDP, because they know that they get their money.

Siatwinda Irrigation	10.128	4.944	6.550	4.918	3.850	4.500	8.000	16.875	9.200
Research 120.000	8.254	6.000	4.600	5.500	2.000	1.000			
Building	5.391	3.500							
Kanchindu (staffquarter)	16.288								
Nkandabwe									
Kafwambila	8.449	3.000	3.500	1.500	2.000	1.100			
Rural Works Programme	1.875	6.656	2.600	1.950	9.900	27.750	20.000	10.233	27.600
Dry Land Farming					2.500	4.100	6.000	5.832	16.500
Workshop Nkandabwe	3.466				3.500	2.400	2.850	23.522	3.000
Appropriate Technology								Lorry	12.500
Coop. Extension							6.500	5.322	2.500
Animal Husbandry Trial							1.250	247	1.250
Vegetable Wials							750	750	750
Erosion Control	3.000	3.800	5.000		1.200		1.400	8.114	2.000
Community development							500	556	2.500
Health Improvement							250		
Craftmen Support	1.594	5.000	6.500	4.500			1.500	1.500	
Irrigation Trials		2.000	4.600	4.082	2.000				
Nkandabwe Camp	5.358	1.200	1.500	1.350	1.500		2.000		2.000
Km Allowances	13.719	15.000	18.000	15.000	15.000	16.500	15.000	16.035	20.000
Salaries		7.500	4.100	9.000	9.300	11.200	13.000	14.181	15.000
Travelling Cosh	537			1.200					
Lorries	1.426	4.000	4.000	6.000	3.000		4.500		
Stationary Office	279	200	300	500	500	750	500	63	500
Subsistence allowance				700	250	500	250	243	500
Office Administration	2.978	1.000							9.600

THE GWEMBE SOUTH AREA
RESEARCH ON THE NEEDS OF THE PEOPLE
AS RELATED TO ACTIVITIES

PART II

FROM
CUSO ZAMBIA

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August, 1984.

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1. INTRODUCTION:

Research is a very difficult venture of varying degrees in terms of existing cultural, social and philosophies as they pertain to development in Gwembe south. However, in the research, the researcher is more concerned with the aspects of the people's perspectives as they relate to economic development as opposed to experts point of view. Because of the complexity of the research, the researcher had to conduct verbal interviews which were recorded as the interviewers responded to the existing projects in Gwembe south.

The data collected in terms of respondents' suggestion and that of the researcher have been directed as follows:-

Fishing Project, Irrigation Schemes, Zilili Gardening along the bank of Kariba and Valley self-help promotion.

2. PURPOSE OF RESEARCH:

A plan designed to support various development activities, such as the thriving fishing industry, irrigation projects and valley self-help promotion project in the Gwembe south, has been made early this year by Canadian University Service Overseas (CUSO). The research is necessitated by the need to assess the involvement and reaction of the people involved in order to ensure its successful implementation. In addition, it aims at relating the plan to population, existing infrastructural services such as health, educational, markets, shops, banks and water facilities.

3. RESEARCH AREA:

Gwembe south is on the road to Livingstone branching to the left before Choma at 266 Km point from Lusaka, lying within the areas of chiefs Mwemba and Sinazongwe in Gwembe District, Southern Province. The need for planning and operation of supporting the existing fishing industry, food production under water irrigation schemes and promotion of village industries within the bounds of Gwembe south has been proposed. In order for planning to be meaningful the researcher felt that statistical data, such as population, number of fishermen, number of small scale industries in the area should be investigated and analyzed. These data after it has been collected, will also serve to provide a base line against which change could be effected and measured to establish a system for future pre-scheme project promotion.

The research was restricted to what was defined as Gwembe south development project covering the position of chief Sinazongwe and chief Mwemba, Gwembe District, Southern Province. This included settlements of the fishermen on the banks of the Lake Kariba and those on the island of the Lake. Natural boundaries in the form of vast waters make the camps on the islands not to be permanent, and to a certain extent restricted the area of research as far as can be determined. Fishing camps comprised of seven main fishing camps and six sub-fishing camps. However out of the seven fishing camps (excluding Chipepo) had markets which were built by the fisheries department and they were not in use at the time of research, because of the problem of maintenance which is supposed to be done either by Fisheries Department or District Council of Gwembe. At the time when markets were in use, Fishermen from fishing camps did meet at these markets with fish traders. These markets were used in fortuitous manner at which place fishermen met to discuss matters concerning social services that were lacking, like shopping centres, churches and clinic.

(a) Population Figure

Currently several Fishermen are shifting from Kafuwe camps with the view of settling in Gwembe south. Many of these new arrivals are settling in immediate vicinity of the Gwembe fishing camps. This movement in fishermen will greatly increase the population from the

figure of 700 recorded in 1983 by the Fisheries Department. Although the population of recorded fishermen is 700 this number represents the fishermen for both Gwembe south and other outlining areas that make Gwembe District. The numbers of respondents that pertains to characteristic of fishermen and other related information, reflects those in Gwembe south only.

4. CHARACTERISTIC OF FISHERMAN:

The fishermen are categorised according to the age group and to the period they have stayed in the camps as follows:- Age group:

Under 26 years

26-35 years respondents talked to, were - 38 men

36-50 years respondents talked to were - 36 men

51 + years respondents talked to were - 26 men as for the period there are
I Less than 2 years - category

II Two years - category

There are those who have been in the area for more than 10 years.

There are those who have turned fishing camps as their homes.

The majority of these fishermen are from other provinces e.g. Luapula and Eastern Provinces; while the other part is made up of local people e.g. the Chilele and Chipalamba fishing camps are dominated by local people.

5. CHARACTERISTS OF FISHING CAMPS:

(a) Sinatandabale Fishing Camp

This is a fishing camp which is .05 Km from the fisheries school. It has about 13 fishermen and a market in permanent materials, plus water facilities build next to it, but not in use at the time of research.

(b) Senga Fishing Camp

This is a fishing camp which is within Sinazongwe harbour; it has 13 fishermen and a market in permanent materials with water facilities build next to it, but not in use at the time of research.

(c) Chilele Fishing Camp

This is a fishing camp which is 40 Km within Sinazongwe area; it has seventeen fishermen and a market in permanent materials with water facilities build next to it, but not used.

(d) Chiyabi Fishing Camp

This is a fishing camp which is 54 Km from the fisheries school; it has about 24 fishermen and a market in permanent materials, with water facilities build next to it, but not used.

(e) Syatwinda Fishing Camp

This is a fishing camp which is in chief Mwemba's area, it has 55 fishermen and a market, in permanent materials with water facilities build next to it, but not used.

(f) Ngoma Fishing Camp

This is a fishing camp which is 47 Km from fisheries training school it has 15 fishermen and a market build in permanent materials with water facilities next to it, but not used.

6. FACILITIES IN USE:

65 of respondents use canoes

15 of respondents use banana boats

20 of respondents use plank boats

The number of fishing nets in Gwembe area in the year 1983 including Chipepo area, was 3,255 nets, this number of nets resulted into catching on the average per year is 89,320.5 Kg of fish. And mostly the nets used at the time were gillnets.

7. FISHERMEN'S COOPERATIVE ACTIVITIES:

In order to get an idea of co-operative activities in circles of fishermen a specific question was asked: What, if any, project did the fishermen at least worked co-operatively?

The registered 226 fishermen at Chilele fishing camp have, co-operatively, carried out such hard work as clearing a five kilometre - long road. At Chiyabi fishing camp they cleared a 3 Km long road. At Natandabale fishing camp they built fishermen's club house by renovating some one's building and at Ngoma fishing camp, they worked together with those in Syatwinda fishing camp and their families raised K15 per family towards the cost of building the clinic on self-help basis. They made a Total of 4,000 bricks for the construction of the clinic. The emphasis here is on group activity which amounts to the involvement of fisherman from at least different fishing camps, and not the type of interaction of an individual fisherman from one fishing camp with another in such areas as selling fish to traders.

(a) Fishing Boats

The total boats being used in the waters of Kariba according to the records of 1983, were 607, out of these 532 are canoes, 22 plank boats, 33 banana boats and 20 metal boats. 12 of these boats are fixed with engines.

8. FISHING ALUCRATIVE TRADE:

Fish trading at the time of the research has proved to be lucrative trade which can result not only in raising income levels of the fishermen but also their social status. A lot of traders in most of the fishing camps visited were women traders who out numbered men traders. The traders pay the fishermen in advance. This arrangement of conducting business, leaves the fishermen with a lot of problems and in some cases they remain without money. In fact, it is hard to see how one stays in fishing industries profitably as the fisherman continues to catch fish for the business men whose money is spent in advance. However, traders take advantage of this situation or arrangement and they generally patronize and exploit fishermen.

9. INSTITUTION:

There are a good number of village institutions in the area and one which is known as fishing development committee has seven fishermen as members, but the committee is not known by most of the fishermen although its goals are that of helping the fishermen. There are no banks. Clinics are very

far from the camps. Almost all main fishing camps have access to some kind of roads and primary schools. The area also has one fisheries school where fishermen are trained in various associated skills.

10. EDUCATION LEVELS OF FISHERMEN INTERVIEWED:

20 of the respondents have not attended formal school

8 of the respondents have reached grade I

6 of the respondents have reached grade II

18 of the respondents have reached grade III

4 of the respondents have reached grade IV

12 of the respondents have reached grade V

8 of the respondents have reached grade VI

6 of the respondents have reached grade VII

12 of the respondents have reached Form II

6 of the respondents have reached Form III

11. FISHING INDUSTRY:

Fishing Industry is a relatively a large industry which is comprised of 6 main land fishing camps with market facilities to which water tanks are built (that is one per each of the six camps). All the buildings are permanent structures and offered more opportunities for selling fish. But the situation as it stands, none of these buildings are being used and may all deteriorate very rapidly due to lack of use and maintenance.

12. FISHERMEN'S FELT NEEDS:

Most of the respondents interviewed made their views known to the researcher and stressed that any economic development as far as they were concerned should/fish-related. This is because they felt that no other venture in terms of development would be meaningful as they have all along benefitted from fishing. Among other felt needs the following were more pronounced. For example:

Type of transportation, lorries, boats, nets, market centres along the banks of the Lake, workshop equipped with all the necessary spare parts. The fishermen also desired to have a bank close to the fishing camps to which everyone of them will be encouraged to save. Loan facilities, mobile shop, mobile clinic and ~~improved~~ road from Sinazeze to points at which fishermen get in touch with traders, getting encouragement on bringing about the formation of co-operative activities in order to bring about self-reliance in fishing industry and required education in terms of facilities.

13. FISHERMENS SUGGESTIONS: AS REGARDS TO FELT NEEDS:

Fishermen themselves felt that:-

(a) each fisherman to have six to ten nets covering all the recommended sizes.

(b) each fisherman to have a boat preferably banana or plank boats.

(c) markets to be built along the banks of the lake to cater almost all the fishing camps in the area.

(d) a mobile shop stocked, with nets, engines and other equipment plus

5/.....

spare parts to be established.

- (e) courses on how to maintain and repair the boat engines to be mounted.
- (f) mobile clinic to operate once or twice a week, to be started so as to provide needed medical facilities to those in the islands.
- (g) water transport to be started.
- (h) a bank to be opened near to the fishermen.
- (i) building an ice plant.
- (J) proper maintenance of the road from Sinazeze to the fishing camp to be carried out.
- (k) fishermen to be encouraged to form a fishermen's service co-operative.

When an open-ended question was asked of the respondents (what development do they like to see being done at present in order to improve the fishing industry in Gwembe south area)? 100 fishermen gave the following as requirements which are as follows:-

- (l) fisherman's store which should be stocked with fishing equipment such as nets, rops, foodstuff, fuel or gas and any other store that may be needed.
- (m) building a workshop in which to repair boat engines and be stocked with various spare parts.
- (n) establish water transport which should be carrying various food stuff for sale to the fishermen in various fishing camps.
- (o) establish a market to which fishermen will be taking the catch up to a period of 30 days, then get paid for the deliveries in total "at an agreed time".
- (p) establish a bank close to the camps in which every fisherman will be compelled to bank the money realised from the sale of fish.

14. SUMMARY OF FINDINGS:

Sinazongwe and Mwemba fishing camps (defined as the area within Gwembe south), have fishermen who are grouped into two areas and these are main land fishing camps and sub-fishing camps located on the Lake's islands, with a total number of about 700 fishermen as recorded by the fisheries department in 1983. Facilities and services being used by the fishermen at the time of research are:

Fisheries school, markets although not used now, canoes and few plank boats, banana boats plus iron boats.

The largest group noted being along the banks of the Lake Kariba, are divided into six main fishing camps with a population of about 10 to 30 fishermen per each fishing camp.

The small group noted bring on the islands of Lake Kariba where camps are divided in several small sub-fishing camps, with a population of about 4 to 25 fishermen per camp.

Some of the men have been doing fishing for more than 10 to 15 years and other fishermen are moving in from Kafue Fishing Camps, to Kariba Fishing Camps.

15. RESEARCHER'S SUGGESTIONS:

The following suggestions, are submitted for consideration:-

I That the organization basis of the fishermen in Gwembe south covering chief Sinazongwe's and chief Mwenda's areas, should be established particularly as necessary foundations for creating self-reliance among the fishermen in the area. One objective is to enable fishermen to deal with whatever problem they experience as far as possible, using their own leadership and any other resources that may be noticed or found in this area.

It should be noted that the following suggestion shows how management principle will apply to fishing service co-operative, in Gwembe south, and how it can be used to manage this type of co-operative successfully. It is intended specifically for fishermen together with their employed staff (secretariat) and the body of representatives as a "nuclear" built out of members who are fishermen.

II That the fishing service co-operative management team should comprise of

- (a) members that is, all the fishermen in the area.
- (b) a body of representatives, that is representatives elected out of the members on the basis of three from each main fishing camp, which will give the body 18 members.
- (c) secretariat, these are hired or employed staff taken on by the body of representatives.
- (d) The trustees or advisors whose membership will be drawn from CUSO, Gossner Mission, Government and Valley self-help promotion etc.

Specific responsibilities:

- (a) Members will:-
 - I Own the group.
 - II Control the group
 - III Express needs and desires that are pertinent to fishing
 - IV Elect competent representatives
 - V Adopt and amend whatever is decided upon.

- (b) A body of representative will:-
 - I Employ competent secretariat
 - II Control the total operation
 - III Make decisions
 - IV Give instructions
 - V Give duties to secretariat

- (c) Trustees, will essentially be

- I Custodians and are charged with safeguarding and managing the assets.
 - II They will act in the interest of all members
 - III They will set long run objectives and make long range plans clearly.

IV They will anticipate future needs of members and explore the economic feasibility of supplying those needs through the established structure.

(d) Hired Staff: This group sometimes known as secretariat will be charged with:-

- I directing business activities
- II They will set goals and make plans
- III They will take steps to carry out general policies that have been laid down by the representative body.
- IV They will organize and co-ordinate activities.
- V They will be helped by a good number of trustees whose membership will be drawn from groups already indicated, who will provide the tools and techniques that can help the secretariat and the body of representative put management principles into practice.

As may be noticed each section of the organization will need different kind of consideration. Hence the suggestion takes into account special management problems, "of the would be fishing service co-operative" encountered when dealing with members, employees who would be supported by trustees and make suggestion for coping with them.

(e) Organization:

The would be fishing service co-operative. As it has been shown, fishing service co-operative with its advantageous position, now it paves the way for CUSO to take on some one with experience in social work and skills to start building an organization which in the long run will turn out to be a fishing service co-operative from a scratch to a stage of registration. The suggested social worker will help to:-

- I Build up membership of the fishing service co-operative to be.
- II Create the body of 18 representatives.
- III Assist in recruiting the workers for the organization to be, while consulting the trustees and for such a person to do this it can take 3 months or just more.

That if the would be fishing service co-operative is adopted, the present six government markets, built in the existing fishing camps should either be sold to the proposed new organization or be given to the group as material contribution, by the government. The fishermen's organization be a service co-operative rather than a group based co-operative which some times results into having the few elected office bearers controlling and getting the most benefit out of it. Taking into account what is suggested, the Fishermen Service Co-operative with its advantageous position that of accommodating the needs of all fishermen in the project development area Gwembe south. Could be looked at as a starting point because of the acquired number of facilities and services that would be acquired. These have been reflected in suggestions by the respondents during the research. The researcher also feels that to establish a Fishermen's service group, it might be simpler and more economical to exploit existing man-power and resources necessary to improve or add to the existing facilities in various Fishermen's main camps, in Gwembe south such as:-

- (a) handover the existing six fish markets to the proposed new service group.
- (b) grant aid to the service co-operative to purchase two speed boats which could be used in collecting fish from the fishermen, there after rush it to the selling points along the banks of the lake.
- (c) grant aid to the Fishermen's Service group with a launch which could be used as a mobile shop and a clinic covering the fishing camps in the area.
- (d) grant aid to the Fishing Service Group with about 4,000 nets made up of the recommended sizes, which they can issue to members on loan basis.
- (e) strengthen the would be formed representative body, so that it could be able to discharge the fishermen needed services.

Body of Representative:

- (a) That the fishermen's body of representative be a service centre rather than a management body made up of none fishermen, and it should be supported by a group of qualified technicians.
- (b) To get views of the fishermen on suggested organization. An open question was asked, that of finding out how members will be recruited to the proposed fishermen's service group. The respondents said that a fisherman who has a permanent house, in each of the six main fishing camps in the area should be taken on as a member. The fee for membership to be suggested at a later stage by fishermen themselves.

The expressed point should be considered seriously at the start of the group so that, fishermen in Gwembe south, benefit from the scheme. The method of getting members as proposed will in the process exclude the nomadic type of fishermen.

As for the women programme, two demonstrators could be employed by CUSO. (That is one working with women in three main fishing camps, while the other deals with the other three, starting the project of preparing the fish for food in various ways.)

PART II

SYATWINDA WATER IRRIGATION
PROJECT

1. KACHINDU WATER IRRIGATION SCHEME:

Iti is an irrigation project situated in chief Mwemba's area about 7 Km from the chief's palace, within Gwembe south, Gwembe District, Southern Province, and it is known as Syatwinda irrigation scheme. 78 people have joined the project of which 28 are women participants. The scheme covers 32 hectares of the land which is divided into 110 plots, and some of the plots measure 0.2 of an hectare each.

The water irrigation scheme begun in the year 1970 as an answer towards shortage of productive land in the area, it is being administered by farmers executive committee which is advised by the professionals. Each member of the scheme is required to pay K18 towards the cost of fuel which they use on pumping water at the end of every year. It is described by participants as a source of food and money. As a result of being in the project, some members have managed to buy the cattle which they are using for farming, more especially by those who had no oxen prior to joining the scheme.

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2. RESEARCH AREA:

The study was restricted to what is termed as Syatwinda Irrigation Scheme located in chief Mwemba's area in Gwembe District. The size of the land covered by the scheme, is determined by the good soil and the extent to which the pumped water will reach and this poses a restriction on the number of participants to be taken on, but because of the popularity of the scheme an extension of the project is planned and about 70 applicants are on the waiting list already.

Number of participants

The 50 farmers on the scheme are joined by their wives which bring the total number of people working on the project to slightly well over 115. Because of this, members do feel that, the scheme should have an area of extension so that families who operate as units would be able to produce even more for themselves.

3. CHARACTERISTIC OF FARMERS IN THE IRRIGATION SCHEME:

Age group

Under 26-35 years respondents talked to were 4

" 36-50 years respondents talked to were 9

" 51+ years respondents talked to were 13

Years spent in the Scheme

Some of the respondents have been with the project for eleven years (11 years) while others have been with the scheme for thirteen years (13 years). Still others have been with the scheme for only 3 years.

The majority of these farmers, which include women, have their houses close to the scheme.

Education Level of the Farmers:

One respondent has reached Grade 2

Two respondents have reached Grade 3

One respondent has reached Grade 4

The rest of the respondents remained silent on the matter.

Characteristic of the Scheme:

The Syatwinda Irrigation Scheme gets its water from the Lake Kariba, by the use of diesel pump whose performances is described to be a source of disappointment because of the perpetual breaking down of the pump and the water keeps running out in the Lake.

The scheme which has been running for at least 6 years, described by the respondents as an answer to the shortage of alluvial land, caused by the coming of the Lake Kariba in Gwembe area.

The fuel consumption on the scheme is 6 litres per day, to which the participants contribute K18 towards the cost per person per year.

The income per person per year is recorded to be K2,000 per each male participant, while the female participants are said to realize K800 per woman per year.

The respondents described the project as the source of food, and a source of money, also it is regarded as a field in which participants are learning the skills of production.

4. FACILITIES IN USE:

The respondents indicated that the scheme has

(a) Two water pumps, the third pump is on order waiting its arrival while the ordered pipes are just about to be received. Some water pipes in the project cannot stand the heat therefore there is need to remove the pipes and replace them with the one that can stand the heat, during the months of September and December.

The respondents also stated that farmers in the scheme use ploughs drawn by oxen and in some cases farmers use hoes.

To run the pump the management orders 3,000 litres of diesel out of which the project uses 2,190 litres for 365 days. There is also a workshop which is owned by government.

5. FARMERS ACTIVITIES:

The respondents indicated that all participants do contribute to the cost of fuel, and offer their labour when the pipe gets broken in order to maintain the project. Commenting on the progressive aspect of the scheme, the respondents explained that so far some farmers have managed to buy oxen out of the funds realized from the project. They have also been able to put their children in school where they would have failed due to difficulties of finding the money for school uniforms and other facilities. The production of the scheme cover crops such as rice, ocrea, tomatoes and onions. Out of these rice and tomatoes are said to be the greatest money earner on the project. One woman participant described the water failure on the project at the moment as a "loss of husband" in a home.

6. INSTITUTIONS:

The project has one administrative committee which administers the affairs of the project and it acts as a link between the Gossner Mission and at one time as link with government.

CHSF-Zambia do provide banking service to the members for it is the one which is closer to the project.

Institutions such as schools and clinics are said to be within reach of the members of the project.

12/.....

7. FARMING UNDER IRRIGATION:

The respondents who were taking into account their individual experience gained on the project, described it as the most appropriate scheme for an area which is hard hit by the draught, in that at the time of its full production, hunger which swept the all of Gwembe south was reduced, families in the irrigation scheme had food to eat, but as the pumping water programme broke down some signs of hunger especially to those in the project, is already being felt. It is in this view that participants are urging those who are helping them to solve the water problem, to act quickly in order to literally save lives.

8. FARMERS FELT NEEDS:

The farmers identified the following needs as regards to farming under water irrigation scheme.

- I Market for the produce.
- II Four bigger water pumps.
- III Transport for the produce.
- IV Additional pipes.
- V Additional number of plots to add to the existing one
- VI Hand spraying machines.
- VII Hand garden folks.
- VIII Tractor for hire.
- IX Oxen for sale to participants on loans.
- X To establish a permanent water station, preferably an electrical pump or dam.
- XI To formulate a new management organization, because the existing one is ineffective.
- XII To introduce a floating pump
- XIII Use asbestos pipes
- XIV The project to have an expert or train a Local Zambian to handle and repair the machines used by the project
- XV Introduce the growing of Irish potatoes.
- XVI The groundnuts.
- XVII Sunflower
- XVIII Maize
- XIX Provide loan facilities to participants.
- XX Establish a canning factory.

PEOPLE'S SUGGESTED ACTION ON THE FELT NEEDS:

Among other felt needs that were suggested the following were more pronounced:-

That!

- a) There is a need to establish a canning factory at the project in order to alleviate the rotting of crops e.g. tomatoes etc.
- b) A market for farm products to be arranged on permanent basis.
- c) To minimize the breakages of the pump at the scheme, there is need to purchase four bigger pumps which could be used alternatively in 13/....

the event of one breaking down in the process.

- (d) Fertilizer be made available for the farmers in the project on loan basis.
- (e) Women in the scheme should have knowledge of handling sales and child care plus food preparation mostly those that are grown in the farm.
- (f) Projects based on the needs expressed by the women in the scheme and outside the scheme to be started and the planning of the programme should take into account women's time on the farms and somewhere else.
- (g) Two lorries be made available to the project for easy and quick transportation of products. *too much*
- (h) Machine for spray be made available so that each farmer will purchase one, or get it on loan, arranged by the scheme. *C. U. Organisation doing it*
- (i) A 12" pipe of asbestos be installed so that the project could be provided with enough water constantly.
- (j) Pipes which cannot stand the heat of the area, should be removed and be replaced with asbestos pipes.
- (k) Another piece of land be marked with equal number of plots so that it could be used as a second stage for those already in the scheme.
- (l) Farming tools such as hand garden tools be made available for sale to the farmers.
- (m) The project should have or own one tractor which could be hired by the farmers for use on breaking deeper the soil where oxen fail. *No. 1000*
- (n) Oxen should be sold to the participants in the scheme on loan to be made available.
- (o) A permanent place on which to fix the water pump be surveyed as soon as possible.
- (p) The present administrative management committee should give way to the one dominated by the farmers.
- (q) A floating pump to be installed so as to answer the problem being created by the drying of the Lake Kariba.
- (r) Crops such as beans, irish potatoes, groundnuts, sunflower and maize be introduced in the project.
- (s) An electrical pump should be installed.
- (t) One additional line of electricity be added to the lines which go to Mamba mine so that it could be used for the pump at Syatwinda irrigation scheme.
- (u) Or use the locomotive engine to generate the electricity by the use of coal.

9. SUMMARY OF FINDINGS:

Syatwinda water irrigation scheme is in chief Mwemba's area, 7 Km away from the palace at Kachindu. It is one of the projects included in Gwembe south development programme. The project has one of the largest number of women 14/

as participants. The scheme has continuously attracted other people to join, because of its big turn out of enough food and money to members, whose records show it, to be in the range of about K2,000 for each male participant per year, while women participants have been said to have recorded K800 per woman per year. It was also emphasized that, the participants could have made much more than this, if there was constant flow of water, and more so if there was an increase of land to each of the existing plot, which are said to have been managed so well by the individual participant.

It was noted during the research that the problem of water has made the scheme to be none productive at this moment in time. And almost all the respondent talked to, expressed much worries of the highest degree. Looking at the scheme's administrative committee one would come up with an impression that it is designed to provide a link with outside groups e.g. Gossner Mission etc., but it does not seem to offer chances of making decision to the farmers which is a vital element in self-propelling organisation. Because of this, it is said that some of the operation in the scheme are handled without the knowledge of most of the participants. This arrangement stands to be a major draw back in the process of transferring the running of the entire scheme into the hands of the participants.

10. RESEARCHER'S SUGGESTIONS AS REGARDS TO FELT NEEDS:

The following suggestions are submitted for consideration with reference towards ~~Kachindu~~ Syatwinda irrigation scheme.

- 1) In order for the scheme to be self supporting, a new structure of organisation be introduced in the project so that farmers will be afforded a chance that of making decision in the process of shaping their development. This in practice will entail members using all their labour, whatever resources they have and those that are around the scheme. Above all if the proposal is adopted much of their activities will be based on their own initiatives, supported by the specialized knowledge outside the scheme.

It should be noted that the above suggestion on this scheme is proposed in order to bring the all management of the project in the hands of the farmers, assisted by the community around them and how they could solicit the outside help.

- (a) The existing project at Syatwinda irrigation be divided into three zones, that is each of the two zones will have 25 members while the third zone will have 28 members and this will bring the total members in the scheme to 78 as per the record of the scheme.

- (b) Each of these zones to elect two members as their representative to what will be named as a management board. To which 3 members from the existing administrative committee will be nominated. During the initial stage, experienced manager will be needed to work with the board who should be provided on arrangement of technical co-operation with other organization. This then will bring the total men in the management board to 11 members (eleven). (c) A secretariat to the board be created and it should be made up of employed members which should include the present project officer who is already a salaried staff. G.R.2
The other members to this group should be expatriate with knowledge in bookkeeping and accounts, who should have a Zambian in the secretariate to under study him, before the contract of the expatriate ends, the Zambian under studying him should be exposed to a lot of training related to the field as a measure to fully prepare him for the job. The members of the present administrative committee if specialized in some field needed - 15/....

by the project could be offered a chance to be employed in the secretariate. Four women demonstrators to be employed and become members of the secretariate under the appropriate function in the scheme that will deal with education.

2) Sources of Capital

Sources of capital for the scheme should be classified as:

- (i) Direct investment by members
- (ii) Non member investors
- (iii) Operations of the project and
- (iv) Organizations this includes those that offer credits facilities.

One part of financial management in the scheme is to consider funds available together with terms under which they may be acquired. To this suggested management, this means that they are required to consider the sources available and develop a financing programme which will best meet the needs of the farmers. Members of the scheme will be required to have direct investments in the project so that this could be significant source, as members have the responsibility for furnishing the capital requirements. With this in mind it is desirable for members to invest in the project especially for the services they use.

Members also should be a source of creditor capital by providing loans and make interest payments. Non members but use some services of the project should be allowed in some cases to get loans.

3) Syatwinda
The Kachirnu Water Irrigation Scheme be saved with an electrical pump, rather than a diesel pumps. As it can be learnt from the Mamba mine who are using an electrical pump, have had constant supply of water without interruption through pump breakdowns, which at the scheme results into unsatisfactory way of providing water to an irrigation scheme. The known information at Syatwinda irrigation is that, during the time of production, it was already a focal point for food in the area and flooded some markets along the line of rail with vegetables. And it is also noted by the people that this was the beginning of some change in the area as far as money circulation originating from village action. It is due to these recorded advantages the scheme brings to people that, the suggestion of an electrical pump becomes more fitting to the project than otherwise. And this would come about if one more extra line is added to the line that goes to Mamba mine and connect the project at the junction of the road where one goes (to 'Syatwinda and the other one goes to the mine) and the distance from this point to the project is only 16 Km or less. The provision of providing electrical pump to the scheme will save dual purpose in that even the would be caning factory would be a reality.

As for the women in the scheme which includes Wives of farmers the researcher suggests that an educational programme arranged on an informal pattern be started using women demonstrators as ~~trainers so that information on how to calculate and handle sales of produce could be given to women, also various ways of demonstrating how to cook these various produce, coming from the farm could be done. These suggested arrangements will minimize the losses of money through change and improve the health of people mostly children by eating what they are producing after using other method of food preparation. Although the crops being grown in the scheme are new to the eating habits of the people, the produce has been proved to be also nutritious. So it is important that women are shown how the produce is prepared. When handling this programme, class concept should be avoided, instead a use of meetings~~

be put to practice, and each subject picked should be handled as a project so that at the end of the project to those who attend the demonstration should be able to do it themselves. The women programme should be seen as a must as it has a lot to do with the much observed nutrition deficiency among the children in the area by the researcher.

PART III

GARDENS ALONG THE BANKS OF
THE LAKE KARIBA IN GWEMBE SOUTH

1. People in Chief Mwemba's area are practising farming along the banks of the Lake Kariba. This kind of farming in the local language is known as Zilili gardening whose activities have so far spread from Syasowa area to Ngoma area, and about 200 people are involved in these. And the programme is made in two parts, that the small gardens which are less than 1 hectare and the bigger ones are said to be ranging from 5 hectares and above, for each plot.

Farming activities in these areas begun in 1981 at the time when the flood started going down in the Lake Kariba, so that some of the good land was covered by water, at the time of water drying lake left a lot of moisture and good soil, which people began to utilize very effectively and in return they are getting good yield out of it therefore the Zilili Farmers mostly those with bigger plots, appear to have stored a lot of food which they have harvested from these plots.

2. Reserach area

THE CHIEF MWEMBA'S AREA

The study was restricted to big size Zilili farmers only and this covered 20 respondents. Type of crops being grown in the area, tools or farming implements used, and where possible to get the reason why people have taken interest in growing food stuff along the banks of the Lake Kariba.

The research study was extended to these areas, because of the encouraging results of food production, which have been going on for the last past 3 years. It is important therefore that information surrounding these areas is known, with a view to determine the nature of encouragement that could be suitable for the area so that they could be registered as additional units of food production in the area. Also to serve as measure of providing some kind of solution in an area in which land shortage for farming is about to appear on the scene.

Population

As from the time when people started extending their farming activities along the banks of the lake, 3 years ago, there has been a steady increase of population in the area and many more, may move in the same areas. This is because of the encouraging results of the crops. More unmarried women are taking part in the project.

3. CHARACTERISTIC OF THE FARMERS

- (a) All the respondents are said to be within the age of 45 to 59+ years.
- (b) All the respondents are growing food twice in a year, and all the work on the Zilili farms are carried out on the family basis.
- (c) There is some kind of shifting cultivation as farmers tend to follow the drying up of the lake.
- (d) In the year 1981 the farmer in these areas were few, but towards 1983 the number of farmers rose very high and it keeps on rising.

4. FARMERS F'LT NEEDS ARE:

- (i) Agriculture Department's services
- (ii) Barbed wire
- (iii) Insecticide
- (iv) Seeds for short sorghum plant
- (v) Tractor for hire

- (vi) Oxen for sale or loan to farmers
- (vii) Small water pump machines to sell to farmers on loan.

5. FARMERS PROPOSED ACTION AS REGARDS TO FELT NEEDS:

- (a) Farmers suggest that the authority/should allow the staff of Agriculture Department, to visit and help the farmers in the Zilili farms, be given so that modern method of farming be introduced.
- (b) Farmers who are troubled by hippos in these areas be allowed to get loans so that they may purchase barbed wire and put it to where the hippo enters to scare them off.
- (c) Different kinds of insecticide used on the crops being grown in the farms be made available for the farmers to buy all the year round.
- (d) Sorghum seeds to be made available especially the short type.
- (e) Tractor hire system to be introduced.
- (f) Loan for buying oxen be made available to farmers.
- (g) Small water pumps be sold to farmers on loan arrangements

6. RESEARCHER'S SUGGESTION:

One of the objective of the Zilili farmers is to produce enough food for people in the area mostly those that are engaged in farming along the banks of the Lake Kariba. To do this properly it would involve aid from other organizations in Gwembe south e.g. the proposed management of the irrigation scheme who if formulated and recognized will be a focus point point for all farming practices in the area. As the irrigation management plans to turn itself into some form of a co-operative, it is important therefore that Zilili farmers must start concerning itself with the relationship and development policies of the management at the irrigation scheme so as to benefit from them.

As from time to time farmers along the banks of the lake will need loan services, hiring of a tractor and buying other farming requirement which they can get easily from the management at the irrigation scheme at Syatwinda.

PART IV

NKANDABWE IRRIGATION
PROJECT

1. Nkandabwe irrigation scheme is only few kilometres from Sinazese and it is on the road towards the abandoned coal mine, and it is in chief Sinazongwe area. The scheme has 80 plots and all of them are under production. It has a service of a committee and one agriculture staff. On this farm participants grow tomatoes, cabbage, beans, rape, maize and many other crops. On the day before the visit to the farm, the participant had made K2,000 a day, out of the sales of tomatoes.

The scheme draws its water from the dams which participants use for irrigation. Although it is said that during the months of September, to December, the furrow from the dam dries up and the scheme then uses a diesel pump for irrigation during the period.

2. RESEARCH AREA

The study on the Nkandabwe irrigation scheme was restricted to what was defined as Nkandabwe farm project, which is in the area of the Chief Sinazongwe, this demanded to have a wide close contact, which covered the chief, the councilor, the project committee members, the women in the scheme plus male participants. So as to get to know how the scheme was organized, the needs of the people in the project and the suggestions to be formulated.

Population:

The population of the families working on Nkandabwe irrigation farm is well over eighty families, that is, each family utilizing one plot and it has on the application list about 30 applicants. During the survey almost all members were found in their plots working very happily, especially in this case in which they were not alerted of the visit. The project has been going on for about 6 years now.

3. FARMERS FELT NEEDS:

Fencing the irrigation farm

Repairing the furrow

raising the dam

Cleaning both dams

Producing the electricity from the upper dam

Secure transport for the product

Levelling the raised part in the farm

Encourage those with land next to the scheme to join the project

To protect the furrow from the animals and

To reduce some of the powers invested into the present project committee at the Nkandabwe irrigation scheme. Women programme to be encouraged in the scheme. A weighing scale of bigger size is needed.

4. PEOPLE'S SUGGESTION TOWARDS THE FELT NEEDS:

(a) Fencing wire to be made available for the members to buy so that they can fence the farm, in order to protect it from animals.

(b) Some cement be made available so that the repair of the dam and the furrow could be done.

- (d) The raised land in the farm be levelled so that the area could be demarketed into plots which could be allocated to the people on the waiting list.
- (e) The ward council in which the project is, should help the project committee on dealing with matters of accepting the applicants and removing the lazy ones in the project in order to avoid, the dislike on the part of the committee members because the project is for everyone in the ward. The scale to be used when conducting the sales of the products of the farm to be made available.

5. RESEARCHER'S SUGGESTION:

If the needed women's programme is designed to cover a wide population in a given area. The researcher suggest that, the Nkandabwe irrigation scheme be divided in 4 zones, so that each zone will have 20 women as participants and this will bring the total women to be involved in the programme to 80. One woman demonstrator will be required to be employed in the scheme whose activities will be supervised by the trainer of trainers station in Gwembe south development area.

As for all the demonstration to be carried with these groups of women in the scheme the action should be based on project arrangement, so that each project completed will provide a solution to the problem identified by the women, with the help of the staff. This is important because almost all the needs of the women in the project or the village are of immediate nature which require practical and applicable nature of solution as opposed to long term solution.

The application of the programme will need some fund on which demonstrators could be employed to work with women in the schemes, and those outside the scheme whose groups could be based on a number of villages may establish a group of twenty women.

6. VALLEY SELF-HELP PROJECT:

After looking at various activities being carried out in Gwembe south development, the researcher thought it to be of much help to look at the group that is designed to promote self-help activities, among groups of people and individual, help in the programme of rural water supply and rural housing. As for the need of the programme the following list was drawn up by members of the executives committee:-

- 1) To promote village water supply
- 2) Promote small-scale industries
- 3) Encourage loans for small water pump to individual family farms. Encourage village workshops according to the activities in the area of Gwembe south, encourage the use of appropriate technology, help in the maintenance of Agriculture implements, to encourage the opening up of workshops where the need for black smith is needed. Encourage Training on metal and machine work, to deal with Agriculture promotion among the women in Gwembe south, to encourage the formation of women groups around their interests and promoting educational programme among the women in Gwembe south.

7. RESEARCHER'S SUGGESTION:

Looking at the nature of the project to be promoted by the V.S.P., in the face of not having experts in the present executive committee. The researcher suggests that the project, use to the full, the three specialized officers who are at the moment being paid by the government because their services are required to the activities proposed to be undertaken.

Because of the need to spread activities fairly in the community, the VSP project may be encouraged to form a council of representatives, whose members will be as follows:-

- 1) Two chiefs, who will chair the council alternatively.
- 2) Counsellors who are leading the wards within Gwembe south.
- 3) Chairmen of the parents teachers association in schools within Gwembe south.
- 4) Senior representatives of the religious organisation in Gwembe south.
- 5) Advisors those who are with the project now and those who may come.
- 6) Functions of council of representative are:-

- a) To control the operation of the VSP through the executive committee of the project,
- b) Give places in which self-help projects are to be done through the executive of the project who in turn plan the programme of action as per the funds available.
- c) To be informed of the service and activities planned by the communities from which the council of representative will arrange a priority list to be followed by the the executive committee as per the fund available, or materials... To encourage village institution and groups to become members so is the individual member, with interest in promoting self-help in Gwembe south.

APPENDIX

PERSONS INTERVIEWED:

Mr. E.W.K. Chilimunda:

Training Officer, Department of Fisheries
at Fisheries Training school, Sinazongwe.

Mr. Mubanga:

Fisheries Development Officer, Department
of Fisheries

Mr. Mutinta:

Project Officer, Syatwinda Irrigation Scheme.

Mr. Muyunda:

Agriculture Officer Kachindu

✓ Hon. J. Syamayuwa:

Chief Mwemba at Kachindu.

Mr. Madiankuku:

Clergyman - UCZ for Zilili farms

Mr. Vickson:

CUSA representative on Zilili farms.

Mr. Phiri

Project Officer Nkandabwe Irrigation Scheme.

✓ Hon. Syatame

Chief Sinazongwe at the Palace

Ward Chairman

Nkandabwe Ward

Mr. Madyankuku Junior:

Executive secretary valley self-help
promotion project.

Ba Abel:

Co-ordinator valley self-help promotion
project.

Mr. Nkinke:

Building Officer Valley self-help promotion
project.

Mr. Mwenya:

In charge of workshop, Agriculture Planning
section.

Mr. Mbale:

Water Development Officer, Agriculture
Planning Section.

Mrs Margaret

In charge of immunization and nutrition,
Agriculture planning section.

GROUP INTERVIEWED

Fishermen in the various camps 100 interviewed

Participants in Syatwinda Irrigation Scheme 26 interviewed

Participants in Zilili gardens 20 interviewed

Participants in Nkandabwe Irrigation Scheme 12 interviewed

Executive Committee Member Valley Self-help
Promotion 3 interviewed

Gwembe Development Project 3 interviewed.

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AN EVALUATION OF THE GWEMBE SOUTH DEVELOPMENT PROJECT

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AN EVALUATION OF THE GWEMBE SOUTH DEVELOPMENT PROJECT

T. Scudder, E. Colson, and M. E. D. Scudder

INTRODUCTION

In November 1981 staff members of the Gwembe South Development Project (GSDP) were preparing to report to the District Council, the Zambian government and the Gossner Mission upon the first ten years of the Project's existence. They saw the possibility of using the local expertise gained during our twenty-five years of studying the social and economic development of Gwembe district and its people. They asked that we look at what the GSDP had done in Gwembe South and suggest possible ways for contributing to its future development. We agreed to do the evaluation, with the understanding that development in Gwembe South be placed in the context of what had happened elsewhere in Gwembe. Gwembe South is evolving into a district, but many of its environmental and institutional conditions are shared with Gwembe North and Central. Many of the problems faced, indeed, exist on a regional basis and are common to the whole central Zambezi basin. Roads, rural electrification and lake transport, for example, need to be planned and implemented for Gwembe District as a whole, while tsetse control requires regional cooperation with Zimbabwe.

This report, it is hoped, will be of use to the Gwembe South Development Project, to the District Council which must plan for all of Gwembe, and to others concerned with rural development.

Section I and II, which follow immediately, are background information. The reader may wish to turn immediately to Sections III and IV where we discuss what is being done and what needs to be done.

I. PROCEDURES

In preparing this report, we draw upon our knowledge of Gwembe, acquired over the time span 1956-1982. During this period Gwembe District has been visited by the one or more members of our team in the following years: 1956, 1957, 1960, 1962, 1965, 1967, 1968, 1970, 1971, 1972, 1973, 1976, 1978, 1981, and 1982. During this

period we have: (1) followed the demographic, social, and economic histories of four villages -- two in Gwembe North, one in Gwembe Central, and one in Gwembe South; (2) followed the careers of selected men and women to learn how Gwembe men and women respond to opportunities and challenges; (3) collected information on the spread of educational facilities and other government services; and (4) recorded the histories of various efforts to bring about faster development through the use of national resources and international aid, especially in connection with crop agriculture, animal husbandry and fisheries.

Against this background we assess the information gathered during our intensive study of the Gwembe South Development Project (GSDP) during the month of April 1982. In this we had full cooperation from staff members. They permitted us to attend staff meetings, made their records available to us, and made themselves available for interviews about what had been done, what should have been done, what could not be done and why, and what might be done in the future. We examined various programmes instituted by GSDP: the three irrigation schemes at Nkandabbwe, Buleya-Malima, and Siatwiinda; female extension work; the various enterprises that fall now under the Valley Self-Help Promotion Fund; the building programme of the Gwembe South Builders. We did not examine the church-related work of the Project and cannot assess how successful this has been. We also interviewed villagers, emergent farmers, fishermen, businessmen, officers of farmers associations and credit unions, and officials living in Gwembe South to learn what they saw as the main developmental problems and how they saw the Gwembe South Development Project as furthering advancement.

Here we emphasize that any evaluation report must look at work done or planned against the physical conditions and environmental assets of the region within which the work must be done, the availability of external resources, the national environment, and most importantly, the interest and willingness of local people to spend their limited capital and energy in the hope of acquiring better lives for themselves and their children. The Gwembe people have always had to deal with a harsh environment and high transportation costs. In the last twenty-five years they have also suffered from the disruptions caused by a forced resettlement and more recently the ravages of war. Under such conditions it is no easy task to implement a development programme with a built-in momentum for growth. Too often growth has been halted by need to use resources to offset serious shortfalls or because outside forces disrupted the local economy. We emphasize that the Gwembe South Development Project cannot be said to have had ten years in which to prove itself. During much of this time, little could be done for reasons beyond its control.

II. SPECIAL FACTORS TO BE KEPT IN MIND

A. War and Resettlement

Twice in the last twenty-five years the Gwembe people have suffered heavy capital losses brought upon them by decisions made in the national interest. First, to build Kariba Dam -- which flooded much of their territory and deprived them of their best soils. Secondly, in the effort to obtain independence for Zimbabwe. Some attempt was made to offset the losses associated with the building of Kariba Dam and the formation of Lake Kariba -- both now regarded as national assets. These efforts included the building of new roads, clinics, and schools; the provision of water supplies; tsetse control and the spread of agricultural, veterinary and fisheries extension services. Many of these gains, however, were wiped out between 1975 and 1980 when Gwembe suffered from Rhodesian raids. Its roads, culverts and bridges were destroyed by land mines or allowed to deteriorate. Its fishing boats were sunk or became derelict along with the lake transport system. Tsetse control was largely given up with consequent loss of livestock including plough oxen. Schools were abandoned. Technical staff became reluctant to go into a war zone. In 1980, Gwembe South, along with the rest of Gwembe, had less infrastructure with which to work than it had in 1970 when the Gossner Mission first planned for its development or in 1972 when the GSDP came into existence.

During the war years, the programmes of the GSDP suffered along with the rest of the Gwembe through the inability of its staff to reach many of the villages where work had been started, and necessary materials could not be supplied due to national shortages and transportation difficulties. During these years the GSDP was essentially a holding operation, with little chance to expand its work or to consolidate programmes as planned. Kafwambila irrigation scheme was one casualty of the war. One could also see the Rural Works/Drylands Farming Programme, begun with great expectations in 1976, as another such casualty. Between 1980 and the present, it can be argued that the GSDP remains a holding operation, though to a lesser extent, because of a serious shortage of funds for capital and recurrent expenditures.

That the GSDP has been able to develop two irrigation projects, to the stage where farmers can take over the operation, is a major achievement under these circumstances. So is the Tonga Crafts Programme, which has been the only source of cash income for some hard pressed areas. So also is the fostering of community self-help programmes.

Gwembe South, however, emerged from the war years to face a very different developmental climate than the one which existed when the GSDP was initiated. The GSDP was initially based upon an

understanding that the Zambian government was able and willing to finance programmes of development and that the need was for expatriate advisors rather than for capital and recurrent funding of projects. This is no longer the case. The Zambian government too has been stripped of resources by the war and finds it difficult to finance new programmes requiring capital inputs or even to provide the funds to continue existing programmes.

The fact remains that outside help is needed. There is now no way for Gwembe South to meet its own needs and contribute to national growth unless it can have access to resources to offset its losses in infrastructure and personal capital. Under these circumstances the need for financial assistance from the Gossner Mission is greater than at any time in the past.

B. Need For Special Funding

Any economic growth large enough to provide for the rapidly increasing population (and the growth rate is very high), requires major inputs: (1) for electrification, on which the extension of irrigation and the growth of local industries depend; (2) for road building and lake transport; and (3) for the reestablishment of the fisheries. Gwembe Tonga were forced from their homes and their fields in 1958 so that Zambia could have electricity, yet none of this electricity is available in Gwembe aside from some electrification in the Chirundu and Siavonga areas in Gwembe North and at Maamba in Gwembe South. The pylons march across the Valley carrying electricity to the cities and farms of the railway belt. The electricity is there, but it is not there for the people of Gwembe. Probably in no other region of Zambia would a rural electrification programme be as simple to implement or have as immediate an impact. Lake Kariba is a vast water reservoir, but only in two areas of Gwembe North is water piped to villages. Its potential for irrigation goes largely untapped. Without electricity and with the present price of diesel fuel, the cost of using the lake for irrigation and village water supplies is prohibitive.

If the Zambian government cannot supply the funding necessary for electrification, roads and lake transport, then further development of Gwembe depends upon access to funding from international sources. The GSDP as presently constituted does not meet these needs of Gwembe South. Instead it has seen the curtailment of its original plans as funding has been cut. In its present form it has little future unless the Gossner Mission is prepared to fund programmes as well as staff; or the Zambian government is prepared to increase substantially its contribution to capital programmes initiated through the District Council; or the GSDP becomes an Integrated Rural Development Project (IRDP) through which international funds can be channeled to the District. If it

has funding for little more than the salaries of staff (as appears now to be the case, whether these are paid by the Gossner Mission or by the Zambian government) it becomes one more centre of demoralization, of which Zambia now has only too many.

C. Local Response to Opportunity

The people of Gwembe in the past have taken advantage of the opportunities available to them. The present state of the District, including Gwembe South, is not due to a reluctance on their part to innovate. Without a knowledge of what has happened in the past, it is only too easy to think that conditions existing at any one period of time are traditional, rather than current responses to perceived risks and possibilities. In the past twenty-five years, Gwembe men quickly took up fishing in the early and mid 1960s, when profits were high and credit was available for boats and nets. They dropped out later in the 1960s when profits fell. Gwembe people invested in cattle as soon as tsetse control made this possible in the late 1950s and early 1960s and shifted from hoe cultivation to ox ploughing. They have experimented with various kinds of grain crops. In the 1970s they became major producers of cotton and sunflower. They keep a close eye on prices and yields. They respond quickly to price incentives and to new possibilities, and they invest in new equipment as well as in education for their children and in such enterprises as stores and transport.

Their interest in innovation is somewhat masked by the fact that they are as cost conscious as they are and so ignore suggestions that promise no immediate profit. Also, they have learned from experience that a diversified production system serves them best.

Those who succeed in one enterprise tend not to go on building up that enterprise. They are more likely to use their gains to start another venture. Thereby they safeguard themselves against the uncertainties of their climate and the changing demand for their produce and services by having a variety of resources upon which to draw. They prefer a diversified farming system to one dependent upon a single crop. They use diversification rather than joint enterprises which require the cooperation of a body of kinsmen or neighbours. Each household unit tries to operate on its own and provide for its own subsistence and its own advancement, turning to kin and neighbours only to offset shortfalls. The failure to take enthusiastically to joint enterprises means that certain kinds of communal advancement are difficult for them to adopt or maintain. They form cooperatives, for example, only under external pressure and without commitment. They have little trust in the promises of government programmes, having seen schemes come and go. They trust themselves more than they trust others, whom they sometimes trust

not at all. This means, however, that they have a freedom to respond as individuals and by their success prove to others that a given pathway is worth following. This freedom to experiment is one of Gwembe's major assets. In fact, Gwembe has a large force of unpaid demonstrators who work under village conditions at their own risk.

Another asset consists of the large number of young men and women who have finished primary school who are now present in every village. They are even more likely to respond to local opportunity than secondary school leavers whose education has pointed them away from agriculture and rural areas. The primary leavers are literate. They see that their best chance is to make a go of things in Gwembe. Some who have worked in cities have returned to Gwembe, believing that through cotton farming or other enterprises they can now do better than in employment. In Gwembe North we found such young people, newly married, to predominate among those applying for LINTCO loans for the improved cultivation of cotton. Since they have trouble finding fields due to increasing land pressure, they are likely to pioneer zilili cultivation in the drawdown zone of Lake Kariba (see Section D.1) just as the young men short of river land dominated the newly evolved matemva cultivation in the 1950s before resettlement. They are also most likely to take advantage of the opportunities associated with the Lake Kariba fisheries. They have the incentive, but they need credit for the purchase of equipment as well as training in the use of nets and boats, such as was given in the late 1950s and early 1960s.

D. The Changing Natural Resource Basin

The various natural resources available to the people of Gwembe South have been changing through time. Of particular significance are changes in the fertility and/or availability of arable land, in grazing and brooze for livestock, and in the fishery resources of Lake Kariba.

Lack of farm land is a particularly serious problem for the new generation of young married men and women who include both primary and secondary school leavers. Like their elders, they are willing to experiment with new crops and crop production techniques. They are Gwembe's most valuable resource. Yet in their search for garden land, increasingly they must either seek out marginal lands at the edge of village cultivation areas or rely on kin for the loan of fields. In the latter case they have little security, since the land can be taken back by the donor before the next agricultural season.

Arable land that is currently uncultivated is especially scarce throughout the area of Chief Mweemba. Soil fertility presumably is

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dropping where the more fertile soils have been kept under almost continual cultivation since 1958 and where periods of fallow are too short to allow the less fertile soils to recover. The Gwembe people know very well when the fertility of their fields begins to drop off and they know when fallowed lands have recovered to the extent that they can once again be farmed. But because of increasing land scarcity due to population increase, they are forced to keep land under cultivation for longer periods than in the past. The situation is especially serious in Siameja where all the more fertile land in the valley of the Mwenda is under cultivation. Siameja farmers are forced to clear and cultivate the steeper hillsides which have low inherent fertility and are easily degraded. Land pressure is also extreme in Nkandabbwe/Sinazeze within Chief Sinazongwe's area, while all available lands between Sianyeuka and Chiabi and in the Ngoma area will soon be placed under cultivation.

Since agriculture must remain the basis for the economy of Gwembe South, more intensive land use is essential. Many villagers and emergent farmers are well aware of this. Examples include the fencing of arable plots near villages as in Siameja; the increasing use of smallstock and cattle dung; and the growing interest of the Gwembe people in irrigation. The Gwembe South Development Project can do much to encourage and facilitate the intensification of agricultural production in regard to dryland farming, recessional cultivation along the Kariba Lake shore margin, and irrigation.

To date the most underused natural resource within the Gwembe Valley is the shoreline (and especially the drawdown area between the high and low water levels) and waters of Lake Kariba. Its potential relates especially to recessional cultivation and fishing, as well as to livestock.

1. Recessional or Drawdown (Zilili) Cultivation

This is a very ancient form of natural irrigation in many of Africa's river valleys and lake basin areas. It is labour intensive and requires little capital. In its commonest form, farmers plant the moist soils along rivers or lakes immediately after the flood waters go down. In the Gwembe Valley, both the tributary deltas and the banks of the Zambezi were so farmed during the dry season, before Kariba Dam was built. First planting occurred right after the annual Zambezi flood. Usually this was in April. As the flood waters went down the zilili cultivators continued to plant maize, legumes, pumpkins, and tobacco on the moist soils until August and September. The crops were harvested before the rise of the Zambezi with the coming of the rains. Because of the staggered nature of the plantings, crops were harvested over a six-month period from June through November — this being one of the advantages of drawdown cultivation. In West Africa, and especially along the middle

Niger, drawdown cultivators also planted an indigenous form of floating rice just before the rise of the flood waters, with the stem lengthening as the water level rose. In those areas two crops per year were harvested.

While the Gwembe people practiced drawdown cultivation before the formation of Lake Kariba, between the end of 1958 and late 1963 the lake reservoir was gradually filling up with water so that no drawdown cultivation was possible. The high point was reached in October 1963, and thereafter the water level dropped over five meters during a five-month period. Though the Gwembe people had never planted zilili gardens along the Zambezi that late in the dry season, some immediately tried zilili gardens along the receding shoreline of the lake. In November 1963 they planted ninety-day (kaile) maize. Yields were excellent, with "some of the best maize ever reaped in the valley" harvested in February and March 1964 according to the senior agricultural officer stationed in the valley. During the next four years, however, there was either little drawdown or the drawdown occurred at very different times. This irregularity made zilili cultivation risky and was probably a major reason why few farmers have cultivated the drawdown areas since that time. They were also busy opening up new bush gardens now that ox ploughing made it possible for them to cultivate larger areas during the rains. Today this alternative is not there for those starting to farm.

In recent years, the drawdown has become predictable. During nine of the last ten years the waters of Lake Kariba have begun to go down during either June or July. They have continued to go down for at least five months until the water level once again begins to rise in December or January. The only exception is the current year (1981/82) when low rainfall kept the reservoir from filling during the rainy season. As a result, water levels can be expected to continue dropping at least until December 1982 or January 1983. In other words, zilili cultivation has been possible every year, including the present one, since 1972/73. Future operations at the Kariba Dam site should increase the predictability of the drop in lake level. Because the soils between the high and low water levels of Lake Kariba are the major area of uncultivated land within Gwembe South we believe that the Gwembe South Development Project should help the Gwembe people use this resource. Problems that can be foreseen include adjudication of land claims as men and women try to extend zilili holdings; adjudication of disputes between cattle owners and cultivators; planning the size of garden strips to run vertical to the shore line; and placing responsibility for fencing. Suggestions on how to help are offered in Section III.2.d. Already a few zilili cultivators have demonstrated the possibility of drawdown cultivation. One farmer at Ngoma has found that the dominant grass (Panicum repens) can be easily ploughed with two oxen if

it is first burned. He has also learned that its presence greatly improves the quality of the mopane soils that he is cultivating, both in regard to structure and organic content.

2. Fishing Kariba

The changing nature of the natural resource base is well illustrated by the evolution of the Kariba Lake fisheries. When the lake began to fill in the late 1950s, there was a large increase in the fish population as nutrients were released from newly flooded soils and predators were dispersed over a wider area by the spreading waters. With the assistance of a well planned and implemented fishery development programme, Gwembe men responded to this new opportunity by taking to fishing in large numbers. By 1963, for example, there were over 2,000 Gwembe men fishing the lake, with the fish catch exceeding 3,000 tons.

In the early and mid 1960s many of these fishermen invested their savings in cattle and a minority invested in small businesses. In addition to the fishermen themselves, many village farmers (both men and women) also benefited by investing in nets loaned or rented to young kin or by selling or exchanging agricultural produce or beer at fish camps. It was fishing which provided much of the capital for buying the cattle -- which in turn enabled Gwembe South farmers to plough with oxen and so increase their production of maize, sunflowers, and cotton. Savings from fishing also were a major source of school fees during the 1960s. As for the stores, beer halls, and other businesses that exist today within Gwembe South, the largest single source of capital for their establishment came from fishing.

During the late 1960s and throughout the 1970s, fishing was no longer a major source of income, with both production and number of fishermen dropping sharply. During 1970 less than 1,000 fishermen caught less than 1,000 tons of fish. Fishing declined still further during the war years. As a result, during the 1970s development planners paid little attention to the fishing potential of Lake Kariba.

Yet the fish are there. Indeed, because of the recent build up in kapenta throughout the lake, fish populations are larger than ever before. With careful planning and plan implementation it should be possible for fishing once again to play a major role in Gwembe South development. Fishing could be one of the major sources of income and employment for some Grade 7 and secondary school leavers throughout the 1980s.

a. The Kapenta Fishery

Currently 10,000 tons of kapenta are being caught in Zimbabwe waters, with at least 2,000 people employed. Though only 2,000 tons were caught in Zambian waters during 1981, there is reason to believe that this amount can be increased to 7,000 to 10,000 tons annually during the years ahead. The kapenta fishery at present is dominated by large commercial rigs which cost at least K30,000 piece. For this reason, local people are not involved as owner/operators but only as low paid employees. While such employment is important (and can be expected to grow until it becomes the largest single source of wage employment within Gwembe), Gwembe people should also become involved in the kapenta fishery as traders and as operators of their own boats.

At present kapenta traders in Gwembe South come mainly from the plateau. They buy 20 kilo of dried kapenta, packed in plastic bags, for approximately K90. The kapenta can be resold in Choma for twice that amount and in Lusaka and on the Copperbelt for at least three times that amount -- leaving a good profit for the trader after transportation costs are deducted, if the trader can deal in large enough quantities. At least one kapenta fisherman has said he would like to give Gwembe South people priority as traders. The main obstacles to their becoming traders appears to be lack of knowledge about opportunities and lack of capital to buy their first 20 kilo bags. The Gwembe South Development Project could provide assistance here as discussed in Section III.

Looking to the future, there are no technical reasons why smaller rigs costing up to K8,000 (complete with nets) could not be built and operated by Gwembe South fishermen. Department of Fisheries personnel at the Sinazongwe Fisheries Training Centre are currently building the first such rig for experimentation. If the Gwembe South Development Project could cooperate with the Department of Fisheries, the development of appropriate rigs and their purchase by local people could be speeded up.

b. The Gill Net Fishery

Though the gill net fishery is still depressed and largely in the hands of fishermen from other districts, again, the fish are there and the number of Gwembe fishermen is already beginning to increase. Indeed, a few Gwembe fishermen are making enough money to purchase cattle once again. But for local fishermen to benefit substantially from this potential, a number of major problems must be solved. These relate to management problems; lack of capital for purchasing boats and nets; and transport problems.

(1) Management Problems. Since the end of the war these have become serious, with three illegal fishing techniques threatening the future of the whole fishery. These are: (a) the use of small mesh nets (especially 2" mesh); (b) the setting of nets across tributary mouths during the breeding season of species that travel up and down the tributaries; and (c) the night driving of fish into nets by beating the water with paddles and sticks to which metal is attached (when these are struck against the water they can make a noise like a gun shot with the result that advancing boats can drive the fish population into the waiting nets). All these techniques must be controlled if the gill net fishery is to grow, since already the size of Tilapia caught is decreasing. Some local fishermen are very well aware of the dangers of these techniques, and wish to see them stopped. But if not stopped, then they too will use them -- accelerating depletion of the fishery. Enforcement of appropriate conservation measures will not be easy. An initial first step that deserves serious consideration is the re-introduction of a closed season between December 15 and March 15.

(2) Lack of Capital for Purchasing Boats and Nets. During the war years, boats and nets deteriorated seriously. Some boats were destroyed by the Rhodesians. Though a few older fishermen are able to purchase new equipment, the price of nets and boats is so high today that few younger men can afford to become fishermen. (A banana boat, for example, now costs approximately K1,500.)

Just as in the early 1960s, some sort of revolving fund for providing credit is needed. At that time many fishermen benefited from such credit. Repayment rates on loans were excellent until about 1963 when loans were increasingly given for engines and larger numbers of gill nets. Our research at that time indicates that the use of engines by fishermen was rarely economical, this being one major reason why loans were not repaid after 1964. We believe engines to be even less economical today. If fishermen wish to buy engines with their own funds, that is their own business, but credit should probably be restricted to boats and nets.

(3) Transport Problems. When, as in the 1960s, a large number of small commercial fishermen are spread along the shores of Lake Kariba they need to be served by an adequate system of lake transport to carry their dried fish to the marketing centres. In the past such a system was provided by the Rural Council and by private individuals operating 26-foot inboard diesels. Though this transport system was inefficient at times and seldom operated with the necessary regularity, it nonetheless provided an invaluable service. Fishermen were able to concentrate on fishing while traders were able to buy fish at the marketing centre and did not have to travel out to the fish camps. Today this transport system does not exist, the larger boats having been destroyed during the war. Significant inputs of capital will be required to replace

these boats. This should be a task for national reconstruction since it can be argued that the present depressed state of the fishery is a result of the war.

3. Livestock

One of the most striking changes along the shores of Lake Kariba since its formation is the invasion of Panicum repens or nzinze. It has driven out other forms of vegetation and colonized both the drawdown area and the area immediately inland from the high water line. This is a very desirable development since Panicum repens is a nutritious grass for both cattle and small stock. Not only does it send up fresh green shoots after mature grass is burned, but it also grows in shallow water, hence providing grazing throughout the dry season. With water and grazing throughout the year, the Kariba foreshore has great potential for livestock production.

Looking to the future, two major problems can be anticipated. These are liver fluke and competition between cattle owners and zilili cultivators. The liver fluke problem already exists. Since liver fluke has spread only recently, Gwembe cattle -- unlike those in Western Province and on the Kafue Flats -- have not yet had time to adapt to it. For this reason, it may become an increasingly serious cause of illness and death. As for competition between cattle owners and zilili cultivators, that can be predicted if zilili gardens increase. The conflict is apt to take the form of one between older men with large herds of cattle grazing the Kariba foreshore and younger men and women just starting their careers as farmers.

Using their strength and energy, these young men and women will be able to open up zilili lands whereas they do not have the capital to purchase cattle. For this reason, and because of serious land pressure among inland cultivators, it is essential that the interests of a small number of elders owning large numbers of cattle do not interfere with the development of zilili land by the younger generation.

III. EVALUATION OF GSDP

We first consider the working of the GSDP staff as a team, because how the team interacts has serious consequences for the effectiveness of the project. We suggest ways of strengthening the staff, on the assumption that the GSDP will continue to play an important role in the development of Gwembe South over the next five years or even the next decade and as an IRDP it may serve as a conduit for international funding. We next evaluate the various

programmes which GSDP now sponsors and consider how these can be changed, expanded, or cut back. Finally, we suggest new programmes -- in dryland farming, livestock management, and fishing -- where GSDP help could make a difference.

A. The Staff and GSDP Dynamics

Although the staff constitutionally is organized as a democratic body and each member ideally has an equal voice, its members are appointed under very different conditions of service and have very different commitments to Gwembe South. The staff is composed of three categories of personnel: (1) expatriates recruited, and paid, by the Gossner Mission under short-term contracts of three years; (2) Zambians employed directly by the GSDP, but without contracts and subject to termination whenever the GSDP ends or government fails to provide money for salaries; and (3) Zambian civil servants seconded to the GSDP by government. Given the governmental policy of placing civil servants outside their district of origin, these last are likely to be strangers to Gwembe or at least have their long-term commitments elsewhere. They come and go, usually at fairly short intervals. Only the Zambians employed directly by the GSDP are Gwembe residents with a long-term stake in the future of the area. They are the ones who provide a continuity in the GSDP. And only they have tried to make a living under Gwembe conditions. Yet no one of them is directly involved in any of the programmes central to the Project's aims of making Gwembe self-sufficient in food and developing cash products which will bring adequate incomes to the majority of Gwembe households. Instead they work on programmes to improve the amenities of life in Gwembe: water systems, Gwembe South Builders, and the workshop attached to the Project. When they speak from practical experience on agricultural programmes supervised by other staff members, they are likely to be seen as interfering.

1. Expatriates

The expatriates employed directly by the Gossner Mission are usually young idealists who have volunteered for service in Gwembe, in part at least as a way of personal growth. They bring with them demands for personal autonomy that reinforce the tendency to treat each enterprise as a separate exercise rather than as part of an integrated development programme. They come with little understanding of local conditions or local interests; they are impatient of the bureaucratic red tape which ties their freedom of action; they want to make their mark by differentiating their own work from that of their predecessors; they are not aware of how far their own assumptions about ends, procedures, and strategies are at variance with local assumptions. By the time they have come to understand

how they can best contribute to local efforts and are into stride, their contracts have little time to run. The GSDP faces the recurrent task of educating and integrating into a working team successive generations of Gossner recruits who leave at the point when they are most useful to the GSDP. Probably any volunteer service suffers from the same need to use energy on education, but the GSDP suffers more than it should because of the high degree of autonomy demanded by and given to each recruit and because the recruits, due to their training and expatriate status, have higher status than the Zambians with long experience on the Project.

We believe that some of the resulting difficulties could be met by one or more devices. Contracts of expatriates should be made to overlap, so that there is a period of handing over. Longer contracts (of four years rather than three) may be advisable, with recruits sent during the first months to live within a village where they experience at first hand conditions with which local people habitually cope. Currently, they usually begin their service at Nkandabbwe Camp in an environment which isolates them from local conditions. Each expatriate recruit should also be assigned to work with a Zambian counterpart who understands the local conditions as well as the national priorities and constraints. This means that recruitment overseas should be planned in close conjunction with the overall programme of the GSDP and the availability of governmental backup through seconded technical personnel. A volunteer, however able, should not be a free lance working on an ad hoc basis, but should be fitted into a programme formulated by the Gwembe people through their District Council.

If longer contracts for expatriates and the overlapping of contracts are impossible, better team coordination can still be provided by recreating the position of team leader. This means stronger leadership than has been acceptable to Gossner Team members in recent years, but we believe such a step is advisable. The planner, a post already created within the GSDP and one which we consider of crucial importance, might fill this role, especially if the person appointed is a senior man or woman with previous experience in Zambia. The team leader should work in close alliance with his or her counterpart, the Zambian civil servant seconded to serve as project coordinator/administrator. This means the planner should be stationed at either Nkandabbwe or Sinazongwe. Because of the lack of housing at Sinazongwe, we believe the best placement would be housing at Nkandabbwe with an office also at Sinazongwe to enable the planner to work closely with District officials.

We believe both planner/team leader and project administrator are essential posts. The coordinator-administrator, as a civil servant, is in an excellent position to inform the GSDP with respect to government policy and constraints and to steer requests through government channels. He is also a means of keeping government

informed on GSDP activities. Presumably in the future he will have a key role in relating the GSDP to the District Council. But by the very nature of his civil servant status he is in a poor position to put forward special requests, or to press for innovations, or to find ways of cutting through red tape.

2. Zambian Civil Servants and Zambian Project Employees

The GSDP needs to make every effort to ensure that the Zambians on its staff are of high quality. Upon this depends the goal of handing over when expatriates are withdrawn. Here the GSDP may face special difficulties -- not because qualified people are unavailable but because many Zambians, including the best trained technicians, are unwilling to accept assignment to Gwembe Valley. They are likely to regard it as a backward area with few of the amenities they have come to expect. Secondment to Gwembe is therefore seen as demotion and exile. They may arrive with little experience of rural life and see village farmers as ignorant peasants. In their own way they have as much to overcome as do the expatriates in coming to terms with local conditions. They suffer, however, from a disadvantage which the expatriates do not face. In comparison with the expatriates, they see themselves as doubly deprived. The expatriates receive higher salaries, are provided with free travel from and to Europe for themselves and dependents, can obtain interest-free loans for the purchase of vehicles, receive kilometre allowances, and have other perquisites which make them more mobile than the Zambians -- and therefore more effective in some situations, whatever their comparative experience or technical skills. Inevitably the comparison is invidious and demoralizing to the Zambians seconded to the GSDP, especially those stationed at Nkandabbwe.

We believe that the Gossner Mission could do something to improve this situation by measures that would make recruitment to Gwembe more attractive and reduce the gap between expatriate and Zambian staff. Special incentives are needed. Incentives which appear to us to be attractive include making available opportunities to attend special courses which advance careers both during and after secondment, these to be taken wherever possible in Zambia or adjacent countries. Interest free loans for vehicles would probably not be appropriate for Zambian civil servants who might suddenly be transferred away from the GSDP. A motor pool under the management of the workshop manager and kilometre allowances might be the solution here. Zambians employed directly by the GSDP might be made eligible for loans, but their present salary levels make this a possibility they cannot use. Adequate housing is essential. Currently this seems a minor problem, but if there is any expansion of staff then more housing must be constructed and funds be made available for this purpose. The Gwembe South Builders have the

skills and could undertake the building programme. Finally, there may be some need to top up the salaries of seconded civil servants.

Provision of such incentives costs money. Currently some of the costs to Gossner arise from higher expatriate salaries and from the expense of transporting expatriates, their dependents and possessions from Europe to Zambia and back. We believe that some of the positions now filled by expatriates could well be filled by Zambians, with subsequent considerable savings. These savings in turn could be used to make jobs in Gwembe South more attractive to Zambian men and women with the skills for rural development. Even if savings were not the goal, we still believe that the time has come when the Gossner Mission should begin to look to Zambia for personnel to meet its commitment to the GSDP.

With improved conditions for Zambians, there should be a lessening of the barriers that now exist between staff members in the different categories. The direct recruitment of Zambians by the Gossner Mission would reduce the contrast between the Gossner Service Team and the GSDP staff as a whole. Moreover, the Gossner Mission would be contributing directly to the buildup of a cadre of trained people able to maintain development within Gwembe after the demise of the GSDP.

3. The Staff Meeting

At the present time, other than the one-to-one interaction between counterparts on the job, the primary field of professional interaction among staff members is at staff meetings and other meetings such as that of the Executive Committee of the VSP in which a number of staff members participate. The meetings tend to be long, wordy, and sometimes demoralizing.

The structure and functioning of the meetings seem to be loosely parliamentarian, but parliamentary procedures are not followed with respect to maintenance of control over discussion. The Chair should take the initiative in requiring members to stick to the agenda and in seeing to it that items on the agenda are covered. It would assist the Chair to do so (1) if the agenda could be prepared and posted several days in advance; (2) if members could have a copy of the minutes of the previous meeting; and (3) if the Chair would rule out of order the reopening of questions settled at previous meetings or elsewhere on the agenda.

The Secretary needs to work closely with whoever is chairing the meeting in working out the agenda. They should place items so that the most important matters are discussed when energies are high. Other devices to expedite discussion include the allocation of specified blocks of time for the consideration of different items

on the agenda — ten minutes, thirty minutes, as appropriate — to insure that each one is adequately discussed. Currently, the first several items tend to preempt the meeting. A large clock placed where it can be seen by everyone helps to control discussion.

At any meeting, attention is likely to wander and so is the discussion, especially when, as in this case, everyone is working in a second language. This strains attention and fosters misunderstanding. Beginning the meeting with a thirty-minute coffee/tea period would give staff members a chance to meet socially before the business meeting begins and also allow for the inevitable delays due to difficulties in transport. After having had a chance to exchange shoptalk, those attending a meeting are less likely to indulge in unnecessary lengthy comments as the meeting develops. If the meeting continues for a considerable period of time, some break and refreshment are needed.

What happens at this point will affect the subsequent tone of the meeting. If what is served contains a large amount of sugar and this is taken on an empty stomach, people tend to react with what is called a "sugar high" in about thirty minutes to one hour. Productivity may be high at that point, but it is rapidly followed by a low. This can result in the meeting breaking up with participants feeling exhausted, dissatisfied, depressed, or angry. This is less likely to happen if some protein is served during the break — groundnuts being one good source, along with fresh fruit and tea or coffee.

Better organization (including careful agenda planning), better time allocation, and better planning of the break might do much to overcome the present feeling among many staff that meetings are a waste of time and lead to unpleasant encounters with other staff members. The staff meeting should be a means of informing colleagues about what is being done and obtaining their advice and cooperation in further work.

4. Training

We have already dealt with this in the sections devoted to expatriates and Zambian staff. We believe that orientation of expatriates is better accomplished through rapid immersion in rural life and local working arrangements than through an orientation course which is likely to perpetuate a series of myths about the whys and how of local response.

Training of Zambian counterparts who will ultimately maintain various aspects of the GSDP's programmes so far has been minimal, though some training has taken place. This is one of the major failures of the GSDP. We recognize that it faces special problems

with respect to training programmes for non-civil servants since special financing must be obtained. Here Gossner Mission inputs could make a significant difference, and providing such training should be given priority even over the recruitment of additional expatriates. The major thrust of the next period should be in furthering the skills of local people in preparation for handing over, rather than in using foreign skills to foster projects which cannot be maintained when the expatriates leave. This fact may be overlooked if the GSDP becomes an IRDP with major investment in electricity and improved communications through better roads and lake transport. But we would argue that in that event a budget item to cover training is even more crucial, given the greater demand for trained personnel in the future.

If possible those chosen for training should be Gwembe men and women — who are most likely to be willing to make their careers in Gwembe. Granted the present financial crisis within the government, Gossner Mission funds are needed for the future training of both government officials seconded to the GSDP and of Zambian staff hired directly by the Project. Where training is recommended by the GSDP, currently it takes too long for special funding to be obtained through the Gossner Mission, with the result that the Zambian staff become demoralized.

B. Interaction with Other Government and Development Personnel and the Need for a GSDP Contingency Fund

Under this topic we include interaction not just with government personnel in the various ministries but also with District Council staff and Councillors and with other development personnel (including other Zambian citizens and expatriates associated with development projects within Gwembe South, Gwembe District, and Zambia as a whole). In general such interaction has been deficient in the past. The GSDP has been permitted to go pretty much its own way according to its own interests and the individual interests of its staff. This situation will change as the District Council becomes the primary planning and implementing agency for the District. Already the trend is to work more closely with government departments operating within Gwembe South and with the District Council. Three agricultural assistants on secondment are working closely with Gwembe South Development Project personnel on the three irrigation projects, while collaboration with the District Council has also existed in the past in connection with the Water Development Programme.

We strongly endorse this trend, which we believe should be extended to other government departments. As decentralization proceeds, one can anticipate an increase in development staff within Gwembe South. Until the economy improves one can also anticipate

that available funding will be insufficient to enable many of these staff members to carry out the work for which they were trained. The GSDP can facilitate the work of such personnel not only by cooperating closely with them but also by helping to eliminate bottlenecks which restrict their effectiveness. There is already a precedent for this approach since the Gossner Mission provided K1,000 during 1981 to enable a series of mobile and fixed courses to be carried out by the staff of the Buleya-Malima Farmers Training Centre. Without such help, the same staff has been unable to hold any course to date during 1982.

Looking to the future, we suggest three approaches. First, that each activity pursued by the Gwembe South Development Project include both GSDP staff and, where relevant, government and District Council staff on secondment. This will not only improve coordination and avoid duplication but it will also improve the effectiveness of all involved. Logical activities for seconded personnel include dryland farming and livestock development as these activities are outlined in subsequent sections.

It does not make sense to second government/District Council personnel to the GSDP unless they are associated directly with GSDP staff in carrying out specific development activities. This is simply because where they are working alone they are less apt to have access to such necessities as transport and fuel and they are more apt to become isolated and ineffective. For this reason the coordinator/administrator should become the counterpart to the planner.

Second, we suggest that the Gossner Mission seriously consider making available to the GSDP a contingency fund initially, perhaps, of K10,000 -- which can be used to assist development activities halted because of relatively small cash shortages. There are many activities which could benefit from small cash infusions. At the moment relatively small sums would enable the Farmers Training Centre to hold courses. Approximately K1,000 would enable the Department of Fisheries to launch the rig that it has designed and constructed for possible use by local kapenta fishermen. In both of these cases major benefits could accrue to the people of Gwembe South. Furthermore, such help might be designed in such a way to assist GSDP activities directly. For example, the Farmers Training Centre could use the grant for courses relating directly to the irrigation, dryland farming, and livestock activities of the GSDP. In return for help on the kapenta rig, the Department of Fisheries might be able to make dried kapenta available which then could be used to assist local people to become fish traders.

Third, we suggest that better liaison with other agencies and personnel interested in Gwembe Development (or in developments of relevance to Gwembe) might prove mutually beneficial. In Gwembe

North, the Zambezi Training Farm is again about to give courses to irrigation farmers from the Middle Zambezi Valley and plans to reorganize the irrigation scheme at the confluence of the Kafue River with the Zambezi. Although this scheme is within Gwembe District and is electrified we do not believe there have been visits between Zambezi Training Farm and GSDP technical personnel, nor between the farmers involved. Yet presumably such visits could be extremely beneficial, as could visits and information exchange with other projects. Now that independence has come to Zimbabwe, a number of development projects are being planned for areas directly across the lake from Gwembe South. In this case, the accumulated experience of the GSDP could be especially relevant to the Zimbabwean authorities, while their plans could be of interest to the GSDP.

C. Irrigation

1. Past and Present

Both expatriate and Zambian staff agree that irrigation development has been both the major thrust and the major success of the Gwembe South Development Project since its commencement. We agree with this assessment. Not only has irrigation development been a success in which the staff of the GSDP can justifiably take pride, but its history also provides useful lessons for future irrigation and other production activities. In the early years of the Siatwiinda project, management was largely in the hands of the GSDP -- with the result that farmers were apt to see the scheme as a government one on which they were employees. Once the farmers took over increasing control through their own Farmers' Executive Committee the situation changed rapidly for the better. Recently, when the lake level fell alarmingly low, the FEC called out the farmers to deepen the intake channel on its own initiative -- without the awareness of the GSDP agriculturalist who found over forty men and women at work when he arrived at the scheme. The farmers have also agreed to take over recurrent expenditure, although individually they are concerned about the high cost of diesel and the possibility of a shrinking profit margin. As for the Nkandabbwe Irrigation Project, that is even closer to self-sufficiency since it has no pumping costs -- while maintenance of the dam and channels is within the competence of the farmers.

We agree with the general concensus of the staff that the GSDP has developed among the people of Gwembe South a favourable orientation toward irrigation, with the result that villagers in both Chiabi and Simumpande have requested help to start their own projects. On the projects themselves appropriate crops have been identified, including those which can be marketed locally, reducing for the moment the problem of exporting surpluses. And the

irrigation farmers have shown an increasing ability to manage their affairs and perhaps to pay recurrent expenditures.

2. The Future

a. The Place of Irrigation Within the Farmers' Production System and the Size of Irrigated Holdings

Granted the diversified nature of production systems within the Tonga household and homestead, we believe that irrigated holdings (including naturally irrigated zilili holdings in the future) should complement other production activities rather than being the sole or even major activity of household members. This is especially the case with dry land farming. Such an approach not only reduces the risk of hunger in an uncertain environment, but more people can have irrigated holdings if holding size can be kept relatively small. While we realize that an increasing minority of farmers can cultivate holdings larger than one lima (0.25ha.) and that they wish to extend their holdings, their growth can only be at the expense of younger farmers who increasingly have access to little or no land. For this reason we believe that holding size should be kept relatively small and that Farmers Executive Committees should be encouraged to recruit as new plot holders suitable Grade 7 leavers, including both men and women, who have shown a willingness to work hard.

Though we are not in a position to recommend holding size, conversations with farmers, agricultural officials, and GSDP staff would appear to suggest that 0.10ha. per household is sufficient for vegetable cultivation and 0.25ha. per household is sufficient for cereal cultivation. In years of poor rainfall, yields or income from such holdings are sufficient to support the household, while in years of adequate rainfall for dryland cultivation such irrigation plots contribute savings for the purchase of cattle and, in some cases, the initiation of business enterprises. Against this background, it would appear most holdings on future irrigation projects should not exceed 0.25ha. per household.

b. Size of Irrigation Projects

So as to spread the benefits of irrigation over the largest area, it follows that initial emphasis should be on a larger number of small projects rather than on one or two middle sized and large projects. Furthermore, if holdings are kept to 0.25ha. and below, small projects of 1-2 hectares can serve up to 10 to 20 households — which would justify the construction (or rehabilitation) of small weirs at the base of the escarpment or in hilly areas; experimentation with small subsurface dams in the lowlands; and further experimentation with handpumps for use under a wide variety

of conditions, including Kariba foreshore cultivation at Kafwambila (but with a wider range of crops). The phrase "initial emphasis" does not preclude, in the future, the development of larger projects in such areas as Buleya-Malima (although such would require electrification) or within appropriate drawdown areas.

c. Local Involvement of People

The history of both the Siatwiinda and Nkandabbwe projects clearly shows that villagers must be involved from the start in the planning of future irrigation projects. They also must be involved from the start in their implementation, management, and evaluation. This recommendation does not mean that the GSDP should sit back and wait for requests from the people for irrigation assistance. In some cases (drawdown cultivation, for example), the GSDP may have to take the initiative by pointing out the potential to the people and explaining what is involved in realizing that potential. Thereafter it would be up to the people to decide whether or not to go on with a project.

d. The Special Case of Drawdown Irrigation

We have already described how the zilili area along the shores of Lake Kariba (and particularly the area between each year's high and low water levels) remains the major source of underused arable land within Gwembe South. Since its initial development by the Gwembe people requires (1) some liaison with the National Irrigation Research Station, FAO and the Central African Power Corporation, (2) soil surveys and the demarkation out of the better zilili lands, (3) research, and (4) extension, we believe that the GSDP should play a major role as facilitator. Certain suggestions as what needs to be done follow:

(1) Liaison with the National Irrigation Research Station (NIRS), FAO, and the Central African Power Corporation (CAPCO). The National Irrigation Research Station is increasingly involved in small scale irrigation projects in different parts of Zambia. It is a research resource of importance to the GSDP.

Liaison with FAO should be established for at least two reasons. First, FAO already has considerable experience with the utilization of drawdown areas in other large African man-made lakes. This is especially true of Lake Volta in Ghana where a research and development project was implemented. Second, it is important to liaison with FAO from the beginning in case an FAO-executed project is implemented in the Chisbi area.

CAPCO has an excellent forecasting system for estimating the volume of water expected to enter Lake Kariba during each rainy season. From these estimates, they should be able to let farmers

know the approximate date when the reservoir can be expected to drawdown. Though we have handed over to the CSDP and the NIRS detailed data on Kariba Lake drawdown since 1972/73, it makes sense for the GSDP to check out conclusions directly with CAPCO and to establish communication with CAPCO. There are CAPCO offices in Lusaka, Kariba, and Salisbury. The Deputy Chairman is E. S. E. Nebwe, who is from Sinazese.

(2) Soil Surveys and Demarcation. Soil surveys are needed in order to designate the best areas for drawdown cultivation as opposed to grazing for livestock. These two forms of land use need be assessed in relationship to each other, so that zilili areas:

- (a) Do not break up important grazing tracts.
- (b) Are laid out in such a way as to minimize the amount of protective fencing needed.
- (c) Emphasize long strips extending vertically through the drawdown zone.

At least initially only a very small proportion of grazing land would be converted to zilili cultivation. Nonetheless local communities should be fully involved in deciding who should use what land. It might make sense to start with the drawdown area in front of Siatwiinda Irrigation Project in Senior Chief Mweemba's domain along with a suitable area in Sinazongwe's Chieftaincy.

(3) Research. Here we have in mind not so much research into appropriate crops (for the Gwembe Tonga already have a farming system for zilili lands while much of the research carried out at Siatwiinda Irrigation Project is also relevant), but rather research on special problems such as the control of elegant grasshoppers (probably Zonocerus elegans) and the best type of fencing to control cattle and hippo encroachment. On the other hand, some further crop research is needed, including the suitability of improved floating rice during the period when the lake level is rising. If such rice can be grown, that would allow double cropping. NIRS can provide valuable advise and assistance here.

(4) Extension and Demonstration. Though the Gwembe people have undertaken zilili cultivation for hundreds of years, cultivation of the Lake Kariba zilili areas is different in a number of respects from zilili cultivation along the Zambezi banks. First, the soils are different -- being derived primarily from Karoo sediments as opposed to being relatively recent Zambezi alluvia. Second, the cultivation season will start later -- in June-July as opposed to April-May. Third, because of variations in lake level from year to year due to varying Zambezi inflows, the drawdown area will vary vertically from one year to another in terms of its

location. For example, this year the lower portion of the drawdown area will include areas which are normally flooded during other years. The implications of these differences need to be explained to the people by extension officers, especially since they have important implications for the layout of land holdings. Demonstration of appropriate production techniques and layouts can be done on such pilot areas as the extension of the Siatwiinda Irrigation Project into the drawdown area.

None of the four tasks outlined above require much capital; nor are they particularly time consuming. Liaison with NIRS, FAO, and with CAPCO can be handled by either the liaison officer in Lusaka, the coordinator-administrator at Nkandabbwe, or the planner who is expected in 1983. As for soil surveys and demarcation, that involves mainly organizing the villagers and emergent farmers in the relevant areas. They already have a good idea of the most appropriate cultivation areas and they must be the ones to designate and layout appropriate zilili areas. As for research and extension, both can be included within current activities of the Gwembe South Development Project and Ministry of Agriculture and Water Development without major increase in either funding or staff. Should FAO execute a drawdown project in the Chiabi area that will of course involve valuable research which can be applied elsewhere. But such a FAO effort is no substitute for GSDP involvement now in drawdown cultivation. First, the FAO project may never materialize since it depends on an improved road system to Chiabi. Second, even if the project does materialize it may take years before it becomes operational. Third, regardless of what happens at Chiabi there is a need now to develop small suitable zilili areas along the lake shore margin of Gwembe South such as can be used by school leavers.

D. Dryland Farming

Though the members of each household try to diversify their production by participating in a range of activities, dryland farming continues to be the most important activity for producing both food and income for the largest number of people in Gwembe South. Its relative importance can be expected to continue throughout the rest of this century. If the GSDP is to affect the lives and livelihood of larger numbers of people than has been the case to date, far more attention than in the past must be paid to dryland farming.

Though the Gwembe Valley is the hottest portion of Zambezi with the least precipitation and the shortest rainy season, the climate of Gwembe South is not unlike that of much of Africa including portions of Kenya and Tanzania and the entire West African and Sudanic Sahel. Perhaps the greatest challenge in tropical African agriculture is to come up with an improved farming system for this

vast region. In the Gwembe as elsewhere it is becoming increasingly clear that the starting point is the existing production system at the household and village level. Historically this includes cereal crops along with legumes, oil crops like sesame, and cucurbits -- with crop cultivation integrated with animal husbandry. The cultivation of a variety of crops in different garden types (with considerable interplanting of food crops in such a diversified system) is basically sound.

In recent years various cash crops like cotton and sunflower have been added to the dryland farming system in Gwembe while the proportion of farmers using animal traction increased significantly during the late 1960s and the early 1970s. (Unfortunately, this is the case in Gwembe North where the proportion of farmers using oxen for cultivation as opposed to hoes has decreased in recent years owing to the spread of bovine trypanosomiasis.) This trend should be encouraged, along with the further diversification of the farming system through the addition of small irrigated plots, fruit trees, and wood lots where possible. Crop rotation is especially important, village farmers in the Zimbabwean portion of the Middle Zambezi Valley having introduced a four-year crop rotation cycle which may allow the permanent cultivation of mopane soils. This includes cereals, legumes, and cotton. Though there has been recent concern in the Gwembe about the increase in cotton production at the expense of cereal production, we believe that the main problem here has been not so much an overemphasis on cotton but too little emphasis on cereal and other food crops. There is ample room for increased production through better pricing policies, the introduction of early maturing cereal varieties, and the extension of more intensive production techniques -- including fencing, tie-ridging, and the application of manure.

A logical starting point is a greater emphasis on sorghum, which grows well in the Gwembe Valley even during years of low and irregular rainfall. Current prices for sorghum are far too low. If the price was raised to that of maize, this single measure would go a long way toward reducing cereal shortfalls within the Gwembe. At the same time it should serve national interests since sorghum flour can be incorporated within bread, hence saving foreign exchange through reduction of wheat imports. Sorghum can also be substituted for maize in the production of animal foods and in the brewing of chibuku, hence leaving more maize for human consumption in bad years. Early-maturing red flammida sorghum has fine malting properties. It was actually grown as a cash crop by the Gwembe people in the early 1970s but production virtually stopped because of pricing policies.

As for improved extension services, extension is best carried out in the farmers' fields -- for then the extension agent can learn at first hand about the farmers' problems, reducing the risk of trying

to extend impractical advice. For this reason we believe that the dryland farming programme proposed for the next five years by H. Fuchs of the GSDP staff is basically sound. According to the Fuchs' proposal, each of the two GSDP agriculturalists would work directly at the village level with an agricultural assistant as counterpart. In each village "they would teach about Lima-Program, animal husbandry, erosion control, fruit trees, vegetable gardens, handpump gardens, etc." In each village the extension workers can see the special problems and advise villagers on the building of latrines, grain stores, dams, wells and other social amenities. Follow up work would continue at fixed intervals over a complete annual cycle.

While this proposal is a good one, we suggest the following modifications:

[1] That the Department of Agriculture second an AA to work with each of the GSDP agriculturalists, preferably selecting the AA from the area in which the extension work is going on.

[2] That the GSDP female extension worker also work primarily in the villages in which the agriculturalists and AAs are working. A trained AA who is a woman should be seconded to work with her, because Gwembe women are farmers and stockowners in their own right.

[3] That the villagers be involved in the selection of the initial villages. As with all new programmes, it is best to start cautiously with flexible procedures which will enable the staff and the villagers to learn from their experience. The first villages selected should be ones in which men and women farmers are not only well disposed toward the programme but also wish to participate themselves.

[4] That the Farmers Training Centre at Malima be involved in the programme through the offering of mobile courses in the villages concerned, especially follow-up courses after the GSDP team has moved to a new set of villages.

There is a urgent need to make available within Gwembe South appropriate early maturing varieties of maize, millet, and sorghum. Though SR 52 is a major seed maize throughout the rest of Zambia, it is an inappropriate variety for Gwembe. Though more appropriate varieties exist (like Pioneer and new Zimbabwean varieties, and perhaps SR 11 and SR 13), enough good seed of these varieties is not available. The GSDP could play a major role if it could liaison with ZAMSEED and Mt. Makulu to ensure that appropriate varieties are available for use in the Gwembe. The same applies equally to early maturing varieties of sorghum and bird-resistant varieties of millet. If certified by ZAMSEED it might be possible for the better emergent farmers in Gwembe South to produce seed in bulk, ensuring its availability.

E. Livestock

1. Livestock Within the Gwembe South Economy

Livestock are already integrated within the farming systems of Gwembe South with most farmers wanting to plough their lands with oxen. Thought of as wealth (hence the general term "lubono" for cattle, sheep and goats), domestic animals are seen as a valuable form of savings. Increasingly they are also seen as a cash crop to be sold on an annual basis rather than just on special occasions, although before annual sales make sense herd size and composition must meet the farmer's needs for oxen trained to plough.

In recent years, there appears to have been a significant increase in illness and deaths among Gwembe South livestock owing to a wide range of causes. Among cattle these include liver fluke, quarter evil, and scabies. Bovine trypanosomiasis is also there and must be continually monitored and controlled. This disease currently is the major cause of cattle deaths in Gwembe North where perhaps 50 percent of the Lusitu herd has died within the past few years due to the spread of tsetse flies. As for small stock, scabies in the 1970s devastated entire herds of goats in parts of Gwembe South while numbers of sheep have declined everywhere in Gwembe since Kariba settlement.

The people of Gwembe South are very concerned about the incidence of illness among adult stock and about high calf mortality. Like owners of livestock throughout Africa they want improved health for their animals. Some emergent farmers and villagers have already begun to purchase medicines from the private sector. Others no doubt are ready to follow their example.

2. The Need for Research

There is a further need for certain types of research. Reports on Gwembe livestock frequently mention overgrazing and conclude that the Valley's carrying capacity for both cattle and goats has been exceeded. Certainly overgrazing occurs in some areas, and in Gwembe North at least it contributes to a higher death rate in years of inadequate rainfall. Elsewhere in Gwembe, inland from the lake, a serious lack of water for stock occurs toward the end of the dry season. On the other hand, there is little evidence that the Gwembe Valley as a whole or Gwembe South specifically is overstocked. Without exception, reports suggesting that the Valley is overstocked have failed to consider the high grazing potential of the Lake Kariba foreshore including the drawdown area. Given the availability of this resource throughout the year, the problem of seasonal overgrazing in Gwembe South is more a problem of the distribution of livestock than total numbers of stock. Many Gwembe

Tonga already realize this. During the dry season cattle grazing the Kariba foreshore from nearby villages may be joined by cattle driven down to Lake Kariba from such inland areas as Siameja, again showing the capacity of the Gwembe people to adapt to new problems by exploiting new opportunities.

We are aware of no research on the carrying capacity of the Kariba foreshore at different times of the year. Clearly such research is badly needed. Research is also needed on the seriousness of the liver fluke threat and on the problem of scabies in goats which appears to be able to wipe out entire herds periodically. Another possible research topic relates to reasons behind the significant decline in the sheep population since resettlement in the 1950s. Throughout Gwembe calving rates seem low and calf mortality high. There is a special need for research on this topic, with the results of research extended directly to village and emergent farmers by the GSDP.

3. The GSDP and Livestock

To date the Gwembe South Development Project has not offered services with respect to cattle, goats or sheep, though some attention has been paid to pigs. Though various proposals have been discussed, with a major report (the Bruns report) submitted to the Ministry of Rural Development in 1975, there has been little follow-up by either the government or GSDP.

Consistent with our belief that the major focus of the Gwembe South Development Project during the next five years should be on intensifying and further diversifying the existing household and village production system, we suggest that the GSDP include livestock development among its activities. The approach here should be to further integrate cattle husbandry with cropping through improved access to healthy oxen; to increase awareness of the appropriateness of cattle within the Gwembe Valley as a cash crop (as opposed to a form of savings); to assist in developing a more reliable and regular marketing system of cattle and goats through the Cold Storage Board and private buyers; and to emphasize goats as a cash crop. In considering our suggestions, it need be kept in mind that in areas like Siameja, livestock are probably the most important part of the farming system in terms of meeting the people's cash needs. Because of high population densities and poor soils outside the Mwenda basin it is unlikely that this area can meet its food needs by growing crops -- hence the crucial importance of helping the livestock industry develop along with fishing and wage employment in nearby mines. In stating this, it is important to include goats as well as cattle in any development programme (and to a lesser extent pigs and other livestock). As Bruns has pointed out, the Gwembe Valley is a paradise for goats, including in 1975

over 50 percent of the entire goat population of Southern Province. Today sale of goats is profitable for both the farmer and the buyer, a good sized castrated male selling for K14 in the Valley and for over K36 on the Plateau. Though no butchering of goats is reported in the statistics for Maamba, that township ought to be a good market for goats.

4. Staffing the GSDP for Livestock Development

Here there are three possibilities. One is to provide financial assistance to the relevant government departments and officials in order to facilitate their current work and to encourage them to work more closely with the GSDP (including, for example, the dryland farming proposal suggested by Mr. Fuchs). A second possibility is to second to the GSDP a livestock officer or a livestock development officer to work closely with the GSDP agriculturalists and female extension worker (including both seconded government personnel and expatriates). The third possibility is for the Gossner Mission to recruit directly to the project a livestock specialist who can work closely with a government counterpart seconded to the GSDP. We favour the third alternative, and suggest that the livestock specialist be recruited from within Zambia (or at least within Africa) rather than in Europe for the reasons outlined in Section III.A. Since recruitment of staff takes time, in the meantime we suggest that the first possibility be implemented at the earliest possible moment.

F. Fishing

Because of the historical importance of fishing in the development of the Gwembe South economy and the current potential of fishing to contribute in a major way to future development, we believe that the Gwembe South/Development Project should participate in the revitalization of the local fishing industry (the potential and problems of which have already been outlined in Section II, The Changing Natural Resource Base).

Though the GSDP has not implemented any fishing activities to date, the recent transfer (February 1982) of the Department of Fisheries from the Ministry of Lands and Natural Resources to the Ministry of Agriculture and Water Development should make an integrated approach to agriculture and fisheries easier. The GSDP might help in the following ways:

[1] Help the Department of Fisheries carry out more effectively its current responsibilities in fisheries research and development. Since the relevant staff are present in the department this can best be done through financial assistance. For example, the GSDP could

contribute to the construction of a kapenta rig which can be used by local fishermen. Such a rig is nearing completion at the Sinazongwe Fisheries Training Centre but its launching has been delayed because the centre has no money to buy resin for finishing the rig.

[2] Help local traders enter the kapenta fish trade by providing, through the VSP, loans of approximately K100 to enable Gwembe residents to begin trading by purchasing at the lake shore a 20 kilo bag of kapenta for transport and resale elsewhere. The VSP could also employ people as traders. In this case the profits from the fish trade could be placed in a VSP revolving fund to help them and others to become independent traders. Looking to the future, participation in the kapenta fish trade could provide a major and much needed source of steady income to the VSP.

[3] Continue current investigations on how the Gwembe people can participate directly in the current large-scale commercial kapenta fishery. Since we do not believe such participation can be done by villagers or through the development of fishing cooperatives, possibilities include ownership of rigs by the District Council or the VSP. However, the financial outlays involved are considerable, so that failure could jeopardize the very existence of a young institution like the VSP. For this reason very careful planning is essential.

[4] Establish a special revolving fund for equipping carefully selected Grade 7 leavers and other men as fishermen, with loans restricted to net purchase or, if larger sums become available, to nets and boats (but not engines).

[5] Assist with reestablishing a lake transport system for carrying fish from outlying camps to such marketing points as Siatwiinda and Sinatendabale-Sinazongwe from which they can be transported elsewhere by road. Since such a system is needed throughout Gwembe District it makes sense for the GSDP to work closely with the District Council which ran such a service in the past. Lake transport also presents possibilities for the VSP although again very careful planning is necessary, granted the considerable financial outlays involved.

The Zambian staff of the GSDP already have considerable Lake Kariba fishery experience. For this reason, we doubt that the type of fishery assistance suggested above requires the recruitment of another expatriate. Depending on the size of its fishery activities, the GSDP may wish to recruit an experienced Zambian who would then work closely with a Department of Fisheries counterpart seconded to the GSDP.

G. GSDP Assisted Institutions

The GSDP has been instrumental in the creation of a number of local institutions which are semi-independent and may become totally independent. Each has its own staff and its own sources of funding and is subject to the control of a general meeting composed of its members. Creating these institutions is a major achievement, even though it is unlikely that all of them will survive through the next decade. It is easier to install physical structures than it is to build the institutional framework that will maintain programmes, and the difficulties of building institutions is the major problem faced in all development efforts. In Gwembe South, the GSDP has succeeded in the face of the local preference for individual enterprise and ad hoc arrangements to achieve particular goals, and lack of trust in group action.

The key organizations are the Valley Self-Help Promotion Fund (VSP), which coordinates a number of different enterprises; the Gwembe South Builders (GSB); the Irrigation Farmers Executive Committees (IFEC); and the credit unions. Comparable organizations do not exist in Gwembe North (aside from a credit union at Sievonga) or Gwembe Central today — earlier attempts at founding cooperatives all floundered within a few years there as in Gwembe South. That such organizations exist in Gwembe South is due to the GSDP, which from the beginning has tried to foster local activities.

The GSDP has also experimented with study groups and a variety of self-help organizations. The structure of the VSP and other GSDP-inspired organizations reflect a past GSDP belief that cooperative behavior of some kind is preferable to private enterprise, and so is in line with Zambian policy. The current GSDP effort to assist people with cooperative organizations requested by them, makes more sense —since any attempt to press the Gwembe people further into the cooperative mold is likely to meet with loss of interest on the part of members who are concerned with their own immediate advantage rather than with the long-term benefits assumed to derive from a building of community. They may well feel that they have all the community they can bear already. Producer's cooperatives and other forms of cooperatives have not previously been successful in Gwembe, and producers' cooperatives have a dismal record almost everywhere. Organizations which have simple easily attainable goals and which can be disbanded when these goals are realized may well be those most likely to generate local response and achieve results.

1. The VSP

The VSP was founded in 1979 as a means of obtaining foreign funds for self-help projects, after it became obvious that the

Zambian government could no longer support the building of schools and clinics or the provision of water supplies. The GSDP also wished to turn over to a nonprofit organization a number of enterprises, such as the Tonga Craft Program, which were expected to be self-supporting and generate profits that could be poured back into Gwembe development through a rotating loan fund to provide credit to local businesses, and through self-help community programmes.

The VSP is governed by a general meeting -- attended by the two chiefs of Gwembe South and local notables and by representatives from various organizations which have been asked to accept membership in the society: local churches, farmers' associations, credit unions, the Gwembe South Builders, and the GSDP. The general meeting elects an executive committee and also its chair and vice-chair, and so chooses those who control the working of the VSP. The executive committee decides on new enterprises, makes loans, and hires a coordinator who in the future should prepare the budget.

Currently the VSP has not achieved full independence. It is not clear how much of its programme is inspired by expatriates serving on the Executive Committee or what activities would survive if the Gossner Mission withdrew. The VSP relies upon the expatriates staff for its treasurer and is largely funded through foreign donations, principally in the form of second-hand clothing sent by German and Dutch supporters of the Gossner efforts for sale locally. Funds from these sales provide much of the funding for self-help programmes, such as the extension of the Kanchindu Clinic, and also help to subsidize some of the other enterprises which fall under the VSP umbrella. Overseas funds also provided for the purchase of a lorry, which ought to generate income through hire to local enterprises now starved for transportation but currently is a financial liability.

If the VSP is to survive, it needs to develop good projects which will generate a profit. It needs to rationalize use of its lorry and develop a profitable transport business. This is not impossible given the shortage of vehicles in Gwembe South. It should be possible for the various enterprises under the VSP to coordinate the purchase of supplies to be brought from the railway line so that the lorry moves with a full load to and from the line of rail rather than make a number of trips at high cost. Local businessmen currently are unwilling to hire the lorry to transport stock because each one is expected to deal independently and pay the full cost of the journey to Choma and return. The VSP staff might well organize a distribution system which would permit a number of local businessmen to move stock or produce at the same time, thus minimizing the cost to each. While there is a reluctance on the part of some members of the VSP Executive Committee to have the VSP lorry compete with local transporters, the lorry is an expensive toy for the VSP unless it can earn its keep and provide funds for a replacement. Either it should show a profit, or it should be sold

now when it still has some monetary value and the money realized be used in strengthening other enterprises. We suggest elsewhere that the VSP might be the means through which Gwembe people could participate in the kapenta fisheries.

The kapenta rigs in use are probably too expensive for individual Gwembe fishermen, but the VSP might finance a rig or rigs. It could sell its catch through local traders who would undertake to distribute kapenta through local shops as well as on the line of rail. The traders might need to be given initial loans to cover the cost of their first purchases of kapenta from the VSP and from the commercial fishermen who now monopolize the fisheries. The profits in the trade, however, are such that the loans should be recoverable. With some coordination, the development of the kapenta trade could also contribute to the financial success of the transport business based on the VSP lorry. The VSP should also consider investment in the processing of a wider range of agricultural products through the use of grinding equipment, oil expressors, and other technology appropriate to the Valley which the VSP either owns outright or finances through its loan programmes.

Currently the most successful of the VSP enterprises is the Tonga Crafts Programme, which was handed over to the VSP as a going concern. This is a major source of income for the people of Kafwambila and certain other remote areas which have small chance of cash cropping or local wage labour. It also maintains a tradition of craftsmanship which provides necessary equipment for Gwembe households. Throughout Gwembe, the shortage and high cost of commercially available utensils and tools have led to a revival of village crafts, but it is only in Gwembe South that local craftsmen can expect a regular sales outlet for their products. The Tonga Crafts Programme should be maintained and expanded. The purchase side of the programme is already well organized, and the demand for quality products has, if anything, improved the local standards of craftsmanship. Marketing, however, needs to be improved and should not continue to rely primarily upon the shop presently housed at the Gossner premises at Kabulonga on the outskirts of Lusaka. When the Gossner Mission withdraws, this outlet will be lost. Furthermore, it probably attracts only a small number of buyers, since only those who already know about it or see its signposts at Kabulonga are likely to become customers. Better placed outlets would probably generate larger sales. Better stocktaking is also needed and purchases and sales prices need to be reevaluated (though the Crafts Programme operated at a profit during 1981, it is currently operating at a loss). Whoever is in charge of the Tonga Crafts Programme will need to be trained in management, accounting, and marketing (the latter may mean learning how to contact overseas markets as well as arranging marketing with local and other dealers). The Museum of Tonga Crafts at Sinazeze is a useful mechanism for displaying (and advertising) Tonga craftsmanship.

The VSP Programme for the Sale of Bicycle Parts is a minor service provided by the GSDP which has been turned over to the VSP. In Gwembe bicycles are becoming scarce because people cannot get the parts to keep them in repair. It has become more difficult to transport patients to clinics and dispensaries, to transport luggage and other equipment, and to travel as a consequence. But provision of spare parts, if these are available in Zambia, can probably be left to shopkeepers, so that the sale of bicycle parts can probably be phased out once the current stock is depleted. The VSP Programme for making axes is probably best left for local craftsmen unless volume can be increased to restore profitability by sale to line of rail outlets. Local craftsmen probably can supply the local demand for axes, as they did in the past, using discarded hoe blades and other cast-off metal.

2. Gwembe South Builders

The general consensus among those to whom we talked is that the Gwembe South Builders cannot survive as a cooperative once the Gwembe South Development Project is terminated. We concur with this assessment simply because there is no evidence to date that producers' cooperatives of any sort are a viable form of organization for the Gwembe Valley, whether composed of farmers, fishermen or builders. Looking to the future, there are two possibilities. One is to disband the Gwembe South Builders as an institution, with the employees (for that is what the individual builders consider themselves) seeking employment elsewhere or becoming self-employed. Since the Gwembe South Builders is a profitmaking organization (under present management) and since it has played a very valuable role in the construction of improved buildings for government departments, disbandment should be postponed until the termination of the GSDP. In the meantime employees should be encouraged to obtain further training, especially in the case of those who wish to establish themselves as independent builders in the future. Since the largest market for such independents is the village housing industry, it makes sense for the GSDP to pay more attention to the utilization of local materials (like kiln fired bricks) for improving village (as opposed to government) housing and outlying structures (including granaries), with the builders in the GSB trained to use these materials. In this way the current gap between village and government construction might be reduced in the future.

The second possibility concerning the future of the Gwembe South Builders is to hand management over to a Zambian who will incorporate the builders as a registered private sector business. Or such a Zambian could be hired to manage the GSB under either the District Council or the VSP. We know such Zambians exist, including

people from Gwembe District. In April one of us met such a man in Sinazeze. He has his own company on the Copperbelt, submits his own tenders for government contracts, and has employed up to thirty workers at one time. Currently he is investigating the possibilities of shifting his activities to Chisekesi, Gwembe Boma, or Munyumbwe. Presumably he would also be willing to consider managing the Gwembe South Builders.

3. Irrigation Farmers Executive Committee

The Committees at Nkandabbwe and Siatwiinda are working well, and seem to be able to operate without supervision. Whether this will be true at Siatwiinda if the Committee takes over the management of the pumping system (paying for diesel and the salaries of the pump operators) remains to be seen. Already the increased water fees, which will be paid to the Farmers Organization to cover operating costs in the future, is a matter of controversy, as is the extension of the Siatwiinda scheme into areas of dryland farming utilized by some of the plotholders on the scheme. These are demanding compensation. The Committee at Siatwiinda is also concerned about the cost of replacing old pipes, laid down at the time the irrigation system was first built in the early 1970s. If they are fully independent, they will have to contract for technicians required in the repairs. Given that the irrigation system failed during the rains of 1981-82 due to breakdown of equipment which could not be made good by their GSDP advisors, they have little reason to have confidence in their own ability to obtain equipment from suppliers at a time of national shortages.

The Siatwiinda Committee therefore faces an uncertain future, adequately though it is functioning at the present moment. The Nkandabbwe Committee has the fewest technical problems to face as irrigation at Nkandabbwe is based on a simple gravity system which requires little more than their own labour for maintenance. The committees at Siatwiinda and also at Buleya Malima face much more difficult problems in the maintenance of their schemes. Probably they will succeed only if they can generate enough income to be able to hire skilled technicians to maintain the systems.

All the schemes face problems of marketing, which are only temporarily resolved by growing crops for which there is local demand. These might best be solved if the committees eventually could be federated into a union, with new FECs added as other irrigation projects come into being. This would allow for economics of scale in marketing, and would justify the purchase of a lorry with which to tap more distant markets. We are aware that some of the staff of the GSDP oppose dependence on markets on the railway line, but here we think they are being unrealistic. A federated union of irrigation farmers in Gwembe South could afford a better

marketing system than currently exists and pay more attention to what customers want. Marketing problems in the future may be partially solved by the construction within the Gwembe Valley of appropriate agro-industries (combining, for example, the canning of kapenta and tomatoes). In the meantime crops like rice and bananas can be profitably exported from the Valley as can locally grown tobacco (tombwe) and okra.

4. Credit Unions

Credit unions in Gwembe South appear to have developed initially because the Siatwiinda irrigation farmers wanted access to credit. They will fill a need in Gwembe for savings schemes which pool resources and also safeguard them. There is no doubt whatsoever that Gwembe people save substantial sums. This has been proven again and again by the outpouring of cash at the time of currency changes. Bills and coins are hoarded against need, and we know of individuals who have had between K1000 and K1500 stored in the ground or hidden in granaries. The other favourite form of saving is through investment in livestock. Both types allow people to draw upon their savings easily. Savers are less likely to use banks and postal savings, because, given the distance that must be traveled to deposit or withdraw money, banks and postal savings are not seen as giving liquidity. The small interest rates they pay do not offset this inconvenience -- moreover people are aware that the return rate from investment in livestock is much better than the return rate on savings in banks or postal savings or building and loan societies. Credit unions, to be successful in Gwembe, must be able to ensure liquidity, and at the same time conceal savings from the watchful eye of kin and neighbours. The rate of interest may be of less importance, given that deposits are in place of hoarding.

Yet there can be no doubt that Gwembe South needs easily accessible savings schemes to provide it with working capital and that credit unions can reach more people than banks and postal savings even if a number of branches of such institutions could be established within the region.

The principal obstacles to be overcome are the lack of trust, which is endemic, and reluctance to repay loans except under pressure. People rarely repay debts unless forced to do so and debts may run on for years until some crisis in social relationships between debtor and donor lends to a demand for repayment. This same expectation makes credit unions fragile arrangements once any large number of loans have been made. While the unions can depend upon expatriates they may survive, since expatriates are assumed to be more trustworthy in the handling of funds than local people and they also can press for repayment because they are not dependent upon the maintenance of long-term social relationships with other

members of the community. If the credit union is to maintain itself after expatriates are withdrawn, there must be some overriding motivation on the part of its members.

We think there may be this motivation in Kanchindu/Siatwiinda and a few other areas where people see the advantage of being able to deposit, on a regular basis, sums in excess of their immediate needs. Fishermen, irrigation farmers, and traders who receive numerous small sums which they fear to fritter away may have a special need of such arrangements, as do those who receive wages or salaries. Those who foresee some pressing need for a loan to finance the purchase of equipment, or the payment of school fees at a time when they cannot expect any cash income, also have an incentive to support a credit union. Those people who sell livestock to finance immediate purchases probably see little advantage of a credit union, as do farmers who receive the major portion of their year's income from sales at harvest time and immediately convert funds into consumer goods and new equipment.

Credit unions therefore should not be pushed except where local people show themselves eager to form a union. Almost everywhere now there are literate men and women who can keep records and carry out the necessary transactions, so this is not the problem. But if they are young they will not have the influence to back up claims against debtors or to ease the fears of those who expect their fellows to take advantage of them. And they themselves may be reluctant to undertake responsibility for the money of others, given the distance from savings institutions in which funds can be deposited, and the difficulties of travel.

H. Other GSDP Activities

We believe that other activities carried out by the GSDP in the future should relate in one way or another to the primary task of diversifying and intensifying the economy of Gwembe South. Activities considered briefly in this section are Alternate Technology, Water Development, and the Workshop.

1. Alternate Technology

Alternate technology has a major appeal to expatriates reacting against the overindustrialization of their countries of origin. For this reason there is a risk that they will try to impose upon areas like Gwembe South technological inputs which are either not wanted by local people or not particularly needed. The best defence against this risk is to relate attempts to introduce alternate technology to other activities of the GSDP which relate directly to development such as dryland farming, irrigation, livestock and

fisheries, and water development. A case in point relates to an ox drawn implement already developed by the GSDP for facilitating tie-ridging. According to research at the Lusitu Substation in Gwembe North, tie-ridging can significantly increase cereal yields within Gwembe District. There has been no attempt, however, to extend this research finding to village farmers; indeed, extension workers to whom we talked in Gwembe South were unaware of the research results. If tie-ridging is one of the procedures to be recommended by GSDP staff involved in dryland farming development, then clearly a practical technology is needed for introducing it. This is where the ox-drawn tie-ridger and similar ox-drawn implements would come in. Indeed, ox-drawn farm equipment is an essential element in the Gwembe farming system now and for a longtime to come. Such equipment is within the financial reach of most Gwembe farmers, the majority of whom have access to ploughs and would welcome inexpensive equipment for use in cultivation. It is therefore worth subsidizing the development of better equipment, provided the results are demonstrated and extended to village and emergent farmers.

Other examples of appropriate technology exist -- such as the development of hand pumps suitable for irrigating small plots, including the Kariba foreshore, and alternate technology for processing cereal and other agricultural products for local consumption and sale. Alternate technology for reducing the drudgery of women in regard to such activities as cooking and the collection of water and firewood is also appropriate. On the other hand the biogas project is a technology unlikely to find acceptance in Gwembe. Elsewhere in the world, biogas programmes have been most successful when biogas has been a by-product rather than the primary aim and where installations have been subsidized by governments. Usually, even then, it is accepted only under pressure of extreme fuel shortage. Even in China, biogas programmes have had little impact in areas where other sources of fuel remain adequate. We see little point therefore in attempting to incorporate biogas technology in extension programmes.

2. Water Development.

This activity is a major one of the GSDP and should continue to be so, granted the serious problems of water scarcity that afflict far too many Gwembe villagers. Since these problems relate to both domestic and productive water uses, water development should be multifunctional. This relates as much to irrigation projects as to boreholes and wells. That is, irrigation projects should be designed in such a way as to facilitate watering of livestock and provision of portable water for domestic purposes. Similarly, village water supplies should cater to both human and livestock needs and, where supplies are sufficient, to watering of small

fenced gardens (such are especially appropriate adjuncts to water supplies for schools and clinics).

In the past the GSDP has cooperated with the District Council in regard to water development, with the District Council being the logical organization for taking over from the GSDP. In anticipation of handing over, any drilling equipment which may be purchased in the future by the GSDP should be of a type which can easily be used, maintained, and repaired by District Council personnel. As with other equipment provided for development purposes it should be standardized so as to facilitate provision of spares and replacement.

3. Workshop

The current plan for the workshop to serve increasingly the needs of the GSDP until such time as the Project is terminated makes sense. To keep GSDP transport operational, to maintain GSDP housing and other physical plant, and to serve the technological needs of the irrigation projects and other development activities is a critically important task. On the other hand, it should be a matter of policy to encourage employees of the workshop to attend courses at institutions like Livingstone TTI and NORTEC and to take trade tests which will advance their careers and prepare them for the day when the workshop will be phased out. Currently the workshop provides training on the job and encourages workers to take trade tests but does not give priority to assisting employees who wish to take trade courses elsewhere.

IV. THE GWEMBE SOUTH DEVELOPMENT PROJECT AS AN INTEGRATED RURAL DEVELOPMENT PROJECT (IRDP)

Though the Ministry of Agriculture and Water Development favours designating the GSDP as an IRDP (in which case it would become the only one in Southern Province), no final decision has yet been implemented. The issue is a complicated one, with many staff members of the GSDP worried about the implications for themselves and for their work of becoming part of an IRDP.

We believe the potential advantages to both the GSDP and to the people of Gwembe outweigh the potential disadvantages. IRDP status is currently the best way (and perhaps the only way) to channel into Gwembe District the international funding which is essential if the necessary district-wide infrastructure is to be provided.

If Gwembe District and Gwembe South are to realize their development potential, major investments in infrastructure are needed. These include an integrated land and water transport system

combining improved roads with barge-traveled water ways on Lake Kariba and major rural electrification.

Neither the government nor the Gossner Mission has the financial resources to provide such infrastructure. On the other hand, should the GSDP become an IRDP, a mechanism is provided for securing necessary external financing which could be used for the development of infrastructure throughout Gwembe District as presently constituted. As a war-torn zone needing rehabilitation, as an area bordering on Zimbabwe, and as a distinctive and unique region of Zambia with considerable development potential, Gwembe District should be in a favourable position to compete for scarce international funds. The World bank, the EEC, and FAO might be especially interested in projects which involve cooperation between Zambia and Zimbabwe in terms of water transport, fisheries development, and tsetse control operations -- all of which would be more effective if Zambian and Zimbabwean activities were coordinated and in some cases integrated (as in the case of a lake transport system which serves both countries).

Because of the current shortage of funds for development purposes, accepting IRDP status may, in fact, be the only way to continue the GSDP. IRDP status also has other advantages. For example, unlike the former Intensive Development Zones, IRDPs are focused on the poorer rural areas, with donors seeing their commitments as lasting for one or more decades. Donors and the IRDP coordinating unit in Lusaka also insist on associating counterparts with all experts and on providing appropriate training for them. IRDPs also work directly with District Councils which are helped to improve their development competence through direct funding and through secondment of expatriate personnel to help solve problems. Training and close cooperation with the District Council have not been stressed by the GSDP in the past. IRDP status would be one way to correct these deficiencies. It would also improve the capacity of the District Council to cooperate with the GSDP.

The democratic and grassroots approach of the GSDP could also make a contribution to the IRDP "family", especially since individual IRDPs are moving toward a greater reliance on volunteers. On the other hand, so that increased development capital and personnel do not push out the GSDP and the Gossner Mission, it is crucial that any IRDP agreement preserve the identity and organization of the Gwembe South Development Project, including personnel and funding provided by the Gossner Mission. None of the activities that we have discussed in Section III of this evaluation require IRDP funding, nor do they require more funding than the Gossner Mission and the Zambian government have provided in the past. To restate our position, we believe that it would be detrimental to the development of Gwembe South for the Gossner Mission to withdraw its support at this time or at any time during the next five years.

Should the GSDP become an IRDP, let the IRDP framework become the mechanism for generating funds, equipment, and personnel for the major infrastructure which is essential for sustained district and Gwembe South development.

In the Gwembe case it is also important for integrated rural development to be interpreted as integrated area development which incorporates both rural portions of Gwembe and such townships as Maamba, Sinazongwe, and Siavonga. As an industrial township, with an increasing labour force and urban population, Maamba could play a much more important role than has been the case to date as a market for Gwembe produce (including crops, livestock and fish) and as a catalyst for providing services for the surrounding rural areas. If the GSDP becomes an IRDP, that step might facilitate a more integrated approach to industrial-urban and rural development within Gwembe District and Gwembe South.

V. EVALUATION AND RESEARCH

Aside from internal assessment, all evaluations to date of the activities of the Gwembe South Development Project have been carried out by expatriates or expatriate organizations. We believe that this is an unfortunate trend, especially since there are available individuals and institutions within Zambia for monitoring and evaluation purposes. The GSDP should make use of these institutions. Examples include the Institute of Rural Development at the University of Zambia (which has recently completed an ILDP evaluation), other institutions and departments of the University of Zambia, the National Council of Scientific Research, Mount Makulu, and the National Irrigation Research Station. Since its director is an authority on liver flukes, the NCSR might be interested in monitoring the liver fluke situation along the shores of Lake Kariba and coordinating efforts toward eventual control. Mount Makulu might be interested in helping Gwembe South to acquire the capacity to produce its own cereal seed through the licensing by ZAMSEED of certain emergent farmers as growers of improved early maturing varieties, while NIRS has an interest in utilization of the Lake Kariba drawdown area.

We have mentioned the need for research in various parts of this evaluation. As with major infrastructure, research programmes should be developed so that they have applicability to all of Gwembe District. In terms of research for agricultural development we believe that much closer contact should be maintained with the Central Research Station of the Ministry of Agriculture and Water Development at Mount Makulu. Their sorghum and millet programme, for example, is of direct relevance to Gwembe needs as is current work with early maturing varieties of maize. Commercial farmers maintain close ties with the Central Research Station to the benefit of both.

The GSDP could serve as a vehicle for extending the results of research directly to Gwembe village and emergent farmers. The same also applies for research on livestock and fisheries.

VI. HANDING OVER

Extension programmes which were halted by the war years have not had a fair test. Granted this, to say that the GSDP has had ten years in which to prove itself and achieve its purposes is incorrect.

In any event, ten years is a short period for a complicated integrated rural development project to become self-sufficient. That period provides time for most of the immediate problems to emerge, other than those associated with radical shifts in national policy, but it does not provide time for inventing and testing solutions. A full generation is not an extreme period of time for a development project as complicated as the GSDP, especially when a major war has occurred within that time span. There should be sufficient flexibility in planning and funding so that individual programmes which need more time to reach self-sufficiency can be extended beyond initial deadlines.

Eventually the GSDP must hand over the responsibility for the programmes it has initiated to local people who must then decide whether they wish to maintain them. In planning for hand-over, some time goals need to be established. We believe that a reasonable goal for most existing programmes would be 1987, or five years hence, although some programmes could be handed over at an earlier date. We have already noted that the Siatwiinda and Nkandabbwe Irrigation Farmer's Executive Committees are assuming considerable responsibility for maintenance of these schemes. The Tonga Crafts Programme might well become independent, even though it now falls under the umbrella organization of the VSP which still appears to need fostering. The credit unions have so far not survived beyond the first period of enthusiasm when interest is high and drawbacks have yet to emerge.

It also ought to be stressed that any project is an evolving system, which generates new problems and new stresses as it evolves. Today's solutions are tomorrow's problems. For this reason, it is essential that the GSDP see the training of men and women, who can evolve with the system and solve the problems of the future, as one of its primary tasks. If it fails in this, it accomplishes little of permanent value.

THE GEMBÉE SOUTH DEVELOPMENT PROJECT

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THE GWEMBE SOUTH DEVELOPMENT PROJECT

INTRODUCTION

In November, 1981 staff members of the Gwembe South Development Project (GSDP) were preparing to report to the District Council the Zambian Government and the Gossner Mission upon the first ten years of the project's existence. They saw the possibility of using the local expertise gained during our twenty-five years of studying the social and economic development of Gwembe District and its people. They asked that we look at what the GSDP had done in Gwembe South and suggest possible ways for contributing to its future development. We agreed to do the evaluation, with the understanding that development in Gwembe South be placed in the context of what has happened elsewhere in Gwembe. Gwembe South is evolving into a District, but many of its environmental and institutional conditions are shared with Gwembe North and Central. Many of the problems faced, indeed, exist on a regional basis and are common to the whole central Zambezi basin. Roads, rural electrification and lake transport, for example, need be planned and implemented for Gwembe District as a whole, while tsetse control requires regional cooperation with Zimbabwe.

This report, it is hoped, will be of use to the Gwembe South Development Project, to the District Council which must plan for all of Gwembe, and others concerned with rural development.

Section I and II, which follow immediately, are background information the reader may wish to turn immediately to sections III and IV where we discuss what is being done and what needs to be done.

I. PROCEDURES

In preparing this report, we draw upon our knowledge of Gwembe, acquired over the time span 1956-1982. During this period Gwembe District has been visited by one or more members of our team in the following years: 1956, 1957, 1960, 1962, 1965, 1967, 1968, 1970, 1972, 1973, 1976, 1978, 1981, and 1982. During this period we have:-

(1) Followed the demographic, social and economic histories of four villages, two in Gwembe North, one in Gwembe Central, and one in Gwembe South; (2) followed the careers of selected men and women to learn how Gwembe men and women respond to opportunities and challenges; (3) collected information on the spread of educational facilities and other government services; (4) recorded the histories of various efforts to bring about faster development through the use of national resources and international aid especially in connection with crop agriculture, animal husbandry and fisheries.

Against this background we assess the information gathered during our intensive study of the Gwembe South Dev. Project (GSDP) during the month of April, 1982.

In this we had full co-operation from staff members. They permitted us to attend staff meetings, made their records available to us, and made themselves available for interviews about what had been done, what should have been done, what could not be done and why, and what might be done in the future. We examined various programmes instituted by GSDP: the three irrigation schemes at Nkandabbwe, Buleya-Malima, and Siatwiinda; female extension work; the various enterprises that fall now under the Valley Selfhelp Promotion Fund; the building programme of the Gwembe South Builders. We did not examine the church-related work of the Project and cannot assess how successful this has been. We also interviewed villagers, emergent farmers, fishermen, businessmen, officers of Farmers Associations and Credit Unions, and officials living in Gwembe South, to learn what they saw as the main developmental problems, and how they saw the Gwembe South Development Project as furthering advancement.

Here we emphasize that any evaluation report must look at work done or planned against the physical conditions and environmental assets of the region within which the work must be done, the availability of external resources, the national environment, and, most importantly, the interest and willingness of local people to spend their limited capital and energy in the hope of acquiring better lives for themselves and their children. The Gwembe people have always had to deal with a harsh environment and high transportation costs. In the last twenty five years they have also suffered from the disruptions caused by a forced resettlement and more recently the ravages of war. Under such conditions it is no easy task to implement a development programme with a built-in momentum for growth. Too often growth has been halted by need to use resources to offset serious shortfalls or because outside forces disrupted the local economy. We emphasize that the Gwembe South Development Project cannot be said to have had ten years in which to prove itself. During much of this time, little could be done for reasons beyond its control.

II. SPECIAL FACTORS TO BE KEPT IN MIND

A. War and Resettlement:

Twice in the last twenty five years the Gwembe people have suffered heavy capital losses brought upon them by decisions made in the national interest. First, to build Kariba dam, which flooded much of their territory and deprived them of their best soils. Secondly in the effort to obtain independence for Zimbabwe. Some attempt was made to offset the losses associated with the building of Kariba Dam and the infestation of Lake Kariba, both now regarded as national assets. These efforts included the building of new roads, clinics and schools; the provision of water supplies; and the spread of agricultural, veterinary and fisheries extension services. Many of these gains, however, were wiped out between 1975 and 1980 when Gwembe suffered from Rhodesian raids. Its roads, culverts and bridges were destroyed by land mines or allowed to deteriorate. Its fishing boats were sunk or became derelict along with the lake transport system. Tsetse control was largely given up with consequent loss of livestock including plough oxen.

Schools were abandoned. Technical staff became reluctant to go into a war zone. In 1980, Gwembe South, along with the rest of Gwembe, had less infrastructure with which to work than it had in 1970 when the Gossner Mission first planned for its development or in 1972 when the GSDP came into existence.

During the war years, the programmes of the GSDP suffered along with the rest of Gwembe through the inability of its staff to reach many of the villages where work had been started and necessary materials could not be supplied due to national shortages and transportation difficulties. During these years the GSDP was essentially a holding operation, with little chance to expand its work or to consolidate programmes as planned. Kafwambila irrigation scheme was one casualty of the war. One could also see the Rural Works/Drylands Farming Programme, begun with great expectations in 1976, as another such casualty. Between 1980 and the present, it can be argued that the GSDP remains a holding operation, though to a lesser extent, because of a serious shortage of funds for both capital and recurrent expenditures.

That the GSDP has been able to develop two irrigation projects, to the stage where farmers can take over the operation is a major achievement under these circumstances. So is the Tonga Crafts Programme, which has been the only source of cash income for some hard pressed areas. So also is the fostering of community self-help programmes.

Gwembe South, however, emerged from the war years to face a very different developmental climate than the one which existed when the GSDP was founded. The GSDP was initially based upon an understanding that the Zambian Government was able and willing to finance programmes of development and that the need was for expatriate advisers rather than for capital and recurrent funding of projects. This is no longer the case. The Zambian Government too has been stripped of resources by the war and finds it difficult to finance new programmes requiring capital inputs or even to provide the funds to continue existing programmes.

The fact remains that outside help is needed. There is now no way for Gwembe South to meet its own needs and contribute to national growth unless it can have access to resources to offset its losses in infrastructure and personal capital. Under these circumstances the need for financial assistance fracture Gossner Mission is greater than at any time in the past.

B. Need for Special Funding

Any economic growth large enough to provide for the rapidly increasing population (and the growth rate is very high), requires major inputs:

1) for electrification, on which the extension of irrigation and the growth of local industries depend, 2) for road building and lake transport and 3) for the re-establishment of the fisheries. Gwembe Tonga were forced from their homes and their fields in 1958 so that Zambia could have electricity, yet none of this electricity is available in Gwembe aside from some electrification in the Chirundu and Siavonga areas in Gwembe North and at Maamba in Gwembe South.

The pylons march across the Valley carrying electricity to the cities and firms of the railway belt. The electricity is there, but it is not there for the people of Gwembe. Probably in no other region of Zambia would a rural electrification programme be as simple to implement or have as immediate an impact. Lake Kariba is a vast water reservoir, but only in two areas of Gwembe North is water piped to villages. Its potential for irrigation goes largely untapped. Without electricity and with present price of diesel fuel the cost of using the lake for irrigation and village water supplies is prohibitive.

If the Zambian Government cannot supply the funding necessary for electrification, roads and lake transport, then further development of Gwembe depends upon access to funding from international sources. The GSDP as presently constituted does not meet these needs of Gwembe South. Instead it has seen the curtailment of its original plans as funding has been cut. In its present form it has little future unless the Gossner Mission is prepared to fund programmes as well as staff, or the Zambian Government is prepared to increase substantially its contribution to capital programmes initiated through the District Council, or the GSDP becomes an IRDP through which international funds can be channelled to the District. If it has funding for little more than the salaries of staff, as appears now to be the case whether these are paid by the Gossner Mission or by the Zambian Government, it becomes one more centre of demoralization, of which Zambia now has only too many.

C. Local Response to Opportunity.

The people of Gwembe in the past have taken advantage of the opportunities available to them. The present state of the District including Gwembe South, is not due to a reluctance on their part to innovate. Without a knowledge of what has happened in the past, it is only too easy to think that conditions existing at any one period of time are traditional, rather than current responses to perceived risks and possibilities. In the past twenty five years, Gwembe men quickly took up fishing in the early and mid 1960s, when profits were high and credit was available for boats and nets. They dropped out later in the 1960s when profits fell. Gwembe people invested in cattle as soon as tsetse control made this possible in the late 1950s and early 1960s and shifted from hoe cultivation to ox ploughing. They have experimented with various kinds of grain crops. In the 1970s they became major producers of cotton and sunflower. They keep a close eye on prices and yields. They respond quickly to price incentives and to new possibilities, and they invest in new equipment as well as in education for their children and in such enterprises as stores and transport.

Their interest in innovation is somewhat masked by the fact that they are as cost conscious as they are and so ignore suggestions that promise no immediate profit. Also they have learned from experience that a diversified production system serves them best.

Those who succeed in one enterprise tend not to go on building up that enterprise. They are more likely to use their gains to start another venture. Thereby they safeguard themselves against the uncertainties of their climate and the changing demand for their produce and services by having a variety of resources upon which to draw. They prefer a diversified farming system to one dependent upon a single crop. They use diversification rather than joint enterprises which require the cooperation of a body of kinsmen or neighbours. Each household unit tries to operate on its own and provide for its own subsistence and its own advancement, turning to kin and neighbours only to offset shortfalls. The failure to take enthusiastically to joint enterprises means that certain kinds of communal advancement are difficult for them to adopt or maintain. They form cooperatives, for example, only under external pressure and and without commitment. They have little trust in the premises of Government programmes, having seen schemes come and go. They trust themselves more than they trust others, whom they sometimes trust not at all. This means, however, that they have a freedom to respond as individuals and by their success prove to others that a given pathway is worth following. This freedom to experiment is one of Gwembe's major assets. In fact Gwembe has a large force of unpaid demonstrators who work under village conditions at their own risk.

Another asset consists of the large number of young men and women who have finished primary school who are now present in every village. They are even more likely to respond to local opportunity than secondary school leavers whose education has pointed them away from agriculture and rural areas. The primary leavers are literate. They see that their best chance is to make a go of things in Gwembe. Some who have worked in cities have returned to Gwembe, believing that through cotton farming or other enterprises they can now do better than in employment. In Gwembe North we found such young people, newly married, to predominate among those applying for LINTCO loans for the improved cultivation of cotton. Since they have trouble finding fields due to increasing land pressure, they are likely to pioneer zilili cultivation in the draw-down zone of Lake Kariba see section DI as the young men short of river land dominated the matemwa cultivation in the 1950s before resettlement. They are also most likely to take advantage of the opportunities associated with the Lake Kariba fisheries. They have the incentive, but they need credit for the purchase of equipment as well as training in the use of nets and boats, such as was given in the late 1950s and early 1960s.

D. The changing Natural Resource Base.

The various natural resources available to the people of Gwembe South have been changing through time. Of particular significance are changes in the fertility and/or availability of arable land, in grazing and browse for livestock, and in the fishery resources of Lake Kariba.

Lack of farm land is a particularly serious problem for the new generation of young married men and women who include both primary and secondary school leavers. Like their elders, they are willing to experiment with new crops and crop production techniques.

They are Gwembe's most valuable resource. Yet in their search for garden land, increasingly they must either seek out marginal lands at the edge of village cultivation areas or rely on kin for the loan of fields. In the latter case they have little security, since the land can be taken back by the donor before the next agricultural season.

Arable land that is currently uncultivated is especially scarce throughout the area of Senior Chief Mweemba. Soil fertility presumably is dropping where the more fertile soils have been kept under almost continual cultivation since 1958 and where periods of fallow are too short to allow the less fertile soils to recover. The Gwembe people know very well when the fertility of their fields begins to drop off and they know when fallowed lands have recovered to the extent that they can once again be farmed. But because of increasing land scarcity due to population increase, they are forced to keep land under cultivation for longer periods than in the past. The situation is especially serious in Siameja where all the more fertile land in the valley of the Lwenda is under cultivation. Siameja farmers are forced to clear and cultivate the steeper hillside which have low inherent fertility and are easily degraded. Land pressure is also extreme in Nkandabbwe/Sinazaze within Chief Sinazengwe's area, while all available lands between Sianyeuka and Chiabi and in the Ngoma area will soon be placed under cultivation.

Since agriculture must remain the basis for the economy of Gwembe South, more intensive land use is essential. Many villagers and emergent farmers are well aware of this. Examples include the fencing of arable plots near villages as in Siameja; the increasing use of smallstock and cattle dung; and the growing interest of the Gwembe people in irrigation. The Gwembe South Development Project can do much to encourage and facilitate the intensification of agricultural production in regard to dryland farming, recessional cultivation along the Kariba Lake shore margin, and irrigation.

To date the most undervalued natural resource within the Gwembe Valley is the shoreline (and especially the draw-down area between the high and low water levels) and waters of Lake Kariba. Its potential relates especially to recessional cultivation and fishing, as well as to livestock.

1. Recessional or Drawdown Cultivation.

This is a very ancient form of natural irrigation in many of Africa's river valleys and lake basin areas. It is labour intensive and requires little capital. In its commonest form, farmers plant the moist soils along rivers or lakes immediately after the flood water go down. In the Gwembe valley, both the tributary deltas and the banks of the Zambezi were so farmed during the dry season, before Kariba Dam was built. First planting occurred right after the annual Zambezi flooded. Usually this was in April. As the flood waters went down the zilili cultivators continued to plant maize, legumes, pumpkins and tobacco on the moist soils until August and September.

The crops were harvested before the rise of the Zambezi with the coming of the rains. Because of the staggered nature of the plantings, crops were harvested over a six month period from June through November - this being one of the advantages of drawdown cultivation. In West Africa, and especially along the Middle Niger, drawdown cultivators also planted an indigenous form of floating rice just before the rise of the flood waters, with the stem lengthening as the water level rose. In those areas two crops per year were harvested. While the Gwembe people practised drawdown (zilili) cultivation before the formation of Lake Kariba, between the end of 1958 and late 1963 the lake reservoir was gradually filling up with water so that no drawdown cultivation was possible. The high point was reached in October, 1963, and thereafter the water level dropped over five meters during a five month period. Though the Gwembe people had not planted zilili gardens along the Zambezi that late in the dry season, some immediately tried zilili gardens along the receding shoreline of the lake. In November 1963 they planted ninety day (kaile) maize. Yields were excellent with 'some of the best maize ever reaped in the valley' harvested in February and March 1964 according to the senior agricultural officer stationed in the valley. During the next four years, however, there was either little drawdown at all or the drawdown occurred at very different times. This irregularity made zilili cultivation risky and was probably a major reason why few farmers have cultivated the drawdown areas since that time. They were also busy opening up new bush gardens now that ox ploughing made it possible for them to cultivate larger areas during the rains. Today this alternative is not there for those starting to farm.

In recent years, the drawdown has become predictable. During nine of the last ten years the waters of Lake Kariba have begun to go down during either June or July. They have continued to go down for at least five months until the water level once again begins to rise in December or January. The only exception is the current year (1981/1982) when low rainfall kept the reservoir from filling during the rainy season. As a result, water levels can be expected to continue dropping at least until December 1982 or January 1983. In other words, zilili cultivation has been possible every year, including the present one since 1972/73. Future operations at the Kariba dam site should increase the predictability of the drop in lake level. Because the soils between the high and low water levels of Lake Kariba are the major area of uncultivated land within Gwembe South we believe that the Gwembe South Development Project should help the Gwembe people use this resource. Problems that can be foreseen include adjudication of land claims as men and women try to extend zilili holdings, adjudication of disputes between cattle owners and cultivators, planning the size of garden strips to run vertical to the shore line, and placing responsibility for fencing. Suggestions on how to help are offered in Section III, 2d. Already a few zilili cultivators have demonstrated the possibility of drawdown cultivation. One at Ngoma has found that the dominant (Panicum repens) can be easily plowed with two oxen if it is first burnt. He has also learned that its presence greatly improves the quality of the mopane soils that he is cultivating both in regard to structure and organic content.

2. Fishing Kariba

The changing nature of the natural resource base is well illustrated by the evolution of the Kariba Lake fisheries. When the lake began to fill in the late 1950s there was a large increase in the fish population as nutrients were released from newly flooded soils and predators were dispersed over a wider area by the spreading waters. With the assistance of a well planned and implemented fishery development programme, Gwembe men responded to this new opportunity by taking to fishing in large numbers. By 1963, for example, there were over 2000 Gwembe men fishing the lake, with the fish catch exceeding 3000 tons. In the early and mid-1980s many of these fishermen invested their savings in cattle and minority invested in small business. In addition to the fishermen themselves many village farmers both men and women also benefited, by investing in nets loaned or rented to young kin or by selling or exchanging agricultural produce or beer at fish camps. It was fishing which provided much of the capital for buying the cattle which in turn enabled Gwembe South farmers to plough with oxen and so increase their production of maize, sunflowers and cotton. Savings from fishing also were a major source of school fees during the 1960s. As for the stores beer halls and other businesses that exist today within Gwembe South, the largest single source of capital for their establishment came from fishing.

During the late 1960s and throughout the 1970s, fishing was no longer a major source of income, with both production and number of fishermen dropping sharply. During 1970 less than 1000 fishermen caught less than 1000 tons of fish. Fishing declined still further during the war years. As a result during the 1970s development planners paid little attention to the fishing potential of Lake Kariba.

Yet the fish are there. Indeed because of the recent build up in kapenta throughout the lake, fish populations are larger than ever before. With careful planning and plan implementation it should be possible for fishing once again to play a major role in Gwembe South Development. Fishing could be one of the major sources of income and employment of some Grade 7 and secondary school leavers throughout the 1980s. The kapenta fishery currently 10,000 tons of kapenta are being caught in Zimbabwe waters, with at least 2,000 people employed. Though only 2,000 tons were caught in Zambian waters during 1981, there is reason to believe that this amount can be increased to 10,000 tons annually during the years ahead. The kapenta fishery at present is dominated by large commercial rigs which cost at least K30,000 a piece. For this reason, local people are not involved as owner/operators but only as low paid employees. While such employment is important (and can be expected to grow until it becomes the largest source of wage employment within Gwembe) Gwembe people should also become involved in the kapenta fishery as traders and as operators of their own boats.

At present kapenta traders in Gwembe South come mainly from the plateau. They buy 50 kilo of dried kapenta, packed in plastic bags, for approximately K90. The kapenta can be resold in Choma for twice that amount and in Lusaka and on the Copperbelt for at least three times that amount, leaving

a good profit for the trader after transportation costs are deducted if the trader can deal in large enough quantities.

At least one Kapenta fisherman has said he would like to give Gwembe South people priority as traders. The main obstacle to their becoming traders appears to be lack of knowledge about opportunities and lack of capital to buy their first 20 kilo bags. The Gwembe South Development Project could provide assistance here as discussed in section III.

Looking to the future, there are no technical reasons why smaller rigs costing up to K8000 (complete with nets) could not be built and operated by Gwembe South fishermen. Department of Fisheries personal at the Sinazongwe Fisheries Training Centre are currently building the first such rig for experimentation. If the Gwembe South Development Project could cooperate with the Department of Fisheries, the development of appropriate rigs and their purchase by local people could be speeded up.

b. The Gill Net Fishery

Though the gill net fishery is still depressed and largely in the hands of fishermen from other districts again the fish are there and the number of Gwembe fishermen is already beginning to increase. A few Gwembe fishermen are making enough money to purchase cattle once again. But for local fishermen to benefit substantially from this potential, a number of major problems must be solved. These relate to management problems; lack of capital for purchasing boats and nets; and transport problems.

(1) Management problems.

Since the end of the war these have become serious with three illegal fishing techniques threatening the future of the whole fishery. These are: 1) the use of small mesh net (especially 2" mesh); 2) the setting of nets across tributary mouths during the breeding season of species that travel up and down the tributaries and 3) the night driving of fish into nets by beating the water with paddles and sticks to which metal is attached (when these are struck against the water they can make a noise like a gun shot with the result that advancing boats can drive the fish population into the waiting nets). All these techniques must be controlled if the gill net fishery is to grow since already the size of Tilapia caught is decreasing. Some local fishermen are very well aware of the dangers of these techniques, and wish to see them stopped. But if not stopped then they too will use them, accelerating depletion of the fishery. Enforcement of appropriate conservation measures will not be easy. An initial first step that deserves serious consideration is the re-introduction of a closed season between December 15 and March 15.

(2) Lack of Capital for Purchasing Boats and Nets.

During the war years, boats and nets deteriorated seriously. Some boats were destroyed by the Rhodesians. Though a few older fishermen are able to purchase new equipment, the price of nets and boats is so high today that few younger men can afford to become fishermen. (A banana boat for example now costs approximately K1500.

Just as in the early 1960s, some sort of revolving fund for providing credit is needed. At that time many fishermen benefited from such credit. Repayment rates on loans were excellent until about 1963 when loans were increasingly given for engines and larger numbers of gill nets. Our research at that time indicates that the use of engines by fishermen was rarely economic, this being one major reason why loans were not repaid after 1964. We believe engines to be even less economic today. If fishermen wish to buy engines with their own funds, that is their own business, but credit should probably be restricted to boats and nets.

(3) Transport problems.

When, as in the 1960s, a large number of small commercial fishermen are spread along the shores of Lake Kariba they need to be served by an adequate system of lake transport to carry their dried fish to the marketing centres. In the past such a system was provided both by the Rural Council and by private individuals operating 26 foot inboard diesels. Though this transport system was inefficient at times and seldom operated with the necessary regularity, it nonetheless provided an invaluable service. Fishermen were able to concentrate on fishing while traders were able to buy fish at the marketing centres and did not have to travel out to the fish camps. Today this transport system is non-existent, the larger boats having been destroyed during the war. Significant inputs of capital will be required to replace these boats. This should be a task for national reconstruction since it can be argued that the present depressed state of the fishery is a direct result of the war.

3. Livestock

One of the most striking changes along the shores of lake Kariba since its formation is the invasion of Panicum repens or nzinze. It has driven out other forms of vegetation colonized both the drawdown area and the area immediately inland from the high water line. This is a very desirable development since Panicum repens is a nutritious grass for both cattle and small stock. Not only does it send up new fresh green shoots after mature grass is burnt, but it also grows in shallow water, hence providing grazing throughout the dry season. With water and grazing throughout the year, the Kariba foreshore has great potential for livestock production.

Looking to the future two major problems can be anticipated. These are liver fluke and competition between cattle owners and zilili cultivators. The liver fluke problem already exists. Since liver fluke has spread only recently Gwembe cattle - unlike those in Western Province and on the Kafue Flats have not yet had time to adapt to it. For this reason, it may become an increasingly serious cause of illness and death. As for competition between cattle owners and zilili cultivators, that can be predicted if zilili gardens increase. The conflict is apt to take the form of one between older men with large herds of cattle grazing the Kariba foreshore, and younger men and women just starting their careers as farmers.

Using their strength and energy, these young men and women will be able to open up zilili lands whereas they do not have the capital to purchase cattle. For this reason, and because of serious land pressure among inland cultivators, it is essential that the interests of a small number of elders owning large numbers of cattle do not interfere with the development of zilili land by the younger generation.

III. EVALUATION OF GSDP.

We first consider the working of the GSDP staff as a team, because how the team interacts has serious consequences for the effectiveness of the project. We suggest ways of strengthening the staff, on the assumption that the GSDP will continue to play an important role in the development of Gwembe South over the next five years or even the next decade and as an IRDP it may serve as a conduit for International funding. We next evaluate the various programmes which GSDP now sponsors and consider how these can be changed, expanded, or cut back. Finally, we suggest new programmes, in dryland farming, live-stock management, and fishing, where GSDP help could make a difference.

A. The Staff and GSDP Dynamics.

Although the staff constitutionally is organized as a democratic body and each member ideally has an equal voice, its members are appointed under very different conditions of service and have very different commitments to Gwembe South. The staff is composed of three categories of personnel: 1) expatriates recruited, and paid, by the Gossner Mission under short-term contracts of three years; 2) Zambians employed directly by the GSDP but without contracts and subject to termination whenever the GSDP ends or Government fails to provide money for salaries; 3) Zambian civil servants seconded to the GSDP by Government. Given the governmental policy of placing civil servants outside their district of origin, these last are likely to be strangers to Gwembe or at least have their long-term commitments elsewhere. Only the Zambians employed directly by the GSDP are Gwembe residents with a long-term stake in the future of the area. They are the ones who provide a continuity in the GSDP. Other members come and go, usually at fairly short intervals. Only they have tried to make a living under Gwembe conditions. Yet not one of them is directly involved in any of the programmes central to the Project's aims of making Gwembe self-sufficient in food and developing cash products which will bring adequate incomes to the majority of Gwembe households. Instead they work on programmes to improve the amenities of life in Gwembe: water systems, Gwembe South Builders, and the Workshop attached to the Project. When they speak from practical experience on agricultural programmes supervised by other staff members they are likely to be seen as interfering.

1 Expatriates.

The expatriates employed directly by the Gossner Mission are usually young idealists who have volunteered for service in Gwembe, in part at least as a way of personal growth.

They bring with them demands for personal autonomy that reinforce the tendency to treat each enterprise as a separate exercise rather than as part of an integrated development programme. They come with little understanding of local conditions or local interests; they are impatient of the bureaucratic red tape which ties their freedom of action; they want to make their mark by differentiating their own work from that of their predecessors; they are not aware of how far their own assumptions about ends, procedures, and strategies are at variance with local assumptions. By the time they have come to understand how they can best contribute to local efforts and are into stride, their contracts have little time to run. The GSDP faces the recurrent task of educating and integrating into a working team successive generations of Gossner recruits who leave at the point when they are most useful to the GSDP. Probably any volunteer service suffers from the same need to use energy on education, but the GSDP suffers more than it should because of the high degree of autonomy demanded by and given to each recruit and because the recruits, due to their training and expatriate status, have higher status than the Zambians with long experience of the project.

We believe that some of the resulting difficulties could be met by one or more devices. Contracts of expatriates should be made to overlap, so that there is a period of handing over. Longer contracts, of four years rather than three, may be advisable, with recruits sent during the first months to live within a village where they experience at first hand conditions with which local people habitually cope. Currently, they usually begin their service at Nkandabbwe Camp in an environment which isolates them from local conditions. Each expatriate recruit should also be assigned to work with a Zambian counterpart who understands the local conditions as well as the national priorities and constraints. This means that recruitment overseas should be planned in close conjunction with the overall programme of the GSDP and the availability of governmental back-up through seconded technical personnel. A volunteer, however able, should not be a free lance working on an ad hoc basis, but should be fitted into programme formulated by the Gwembe people through their District Council.

If longer contracts for expatriates and the overlapping of contracts are impossible, better team coordinator can still be provided by recreating the position of team leader. This means stronger leadership than has been acceptable to Gossner Team members in recent years, but we believe such a step is advisable. The planner, a post already created within the GSDP and one which we consider of crucial importance, might fill this role, especially if the person appointed is a senior man or woman with previous experience in Zambia. The team leader should work in close alliance with his or her counterpart, the Zambian civil servant seconded to serve as Project Co-ordinator/Administrator. This means the Planner should be stationed at either Nkandabbwe or Sinazengwe. Because of lack of housing at Sinazenge, we believe the best placement would be housing at Nkandabbwe with an office also at Sinazengwe to enable the Planner to work closely with district officials.

We believe both planned Team leader and project Administrator are essential posts. The Co-ordinator - Administrator as a civil servant is in an excellent position to inform the GSDP with respect to government policy and constraints and to steer requests through government channels. He is also a means of keeping government informed on GSDP activities. Presumably in the future he will have a key role in relating the GSDP to the District Council. But by the very nature of his civil servant status, he is in a poor position to put forward special requests or to press for innovations or to find ways of cutting through red tape.

2. Zambian Civil Servants and Zambian Project Employees.

The GSDP needs to make every effort to ensure that the Zambians on its staff are of high quality. Upon this depends the goal of handing over when expatriates are withdrawn. Here the GSDP may face special difficulties, not because qualified people are unavailable, but because many Zambians, including the best trained technicians, are unwilling to accept assignment to Gwembe Valley. They are likely to regard it as a backward area with few of the amenities they have come to expect. Secondment to Gwembe is therefore seen as demotion and exile. They may arrive with little experience of rural life and see village farmers as ignorant peasants. In their own way they have as much to overcome as do the expatriates in coming to terms with local conditions. They suffer, however, from a disadvantage which the expatriates do not face. In comparison with the expatriates, they see themselves as doubly deprived. The expatriates receive higher salaries, are provided with free travel from and to Europe for themselves and dependents, can obtain interest free loans for the purchase of vehicles, receive kilometre allowances, and have other perquisites which make them more mobile than the Zambians and therefore more effective in some situations, whatever their comparative experience or technical skills. Inevitably the comparison is invidious and demoralizing to the Zambians seconded to the GSDP, especially those stationed at Nkandabbwe.

We believe that the Gossner Mission could do something to improve this situation by measures that would make recruitment to Gwembe more attractive and reduce the gap between expatriate and Zambian staff. Special incentives are needed. Incentives which appear to us to be attractive include making available opportunities to attend special courses which advance careers both during and after secondment, these to be taken wherever possible in Zambia or adjacent countries. Interest free loans for vehicles would probably not be appropriate for Zambian civil servants who might suddenly be transferred away from the GSDP. A motor pool under the management of the workshop managed and kilometre allowances might be the solution here. Zambians employed directly by the GSDP might be made eligible for loans but their present salary levels make this a possibility they can not use.

Adequate housing is essential. Currently this seems a minor problem, but if there is any expansion of staff then more housing must be constructed and funds be made available for this purpose. The Gwembe South Builders have the skills and could undertake the building programme. Finally, there may be some need to top up the salaries of seconded civil servants.

Provision of such incentives costs money. Currently some of the costs to Gossner arise from higher expatriate salaries and from the expense of transporting expatriates, their dependents and their possessions from Europe to Zambia and back. We believe that some of the positions now filled by expatriates could well be filled by Zambians with subsequent considerable savings. These savings in turn could be used to make jobs in Gwembe South more attractive to men and women with the skills for rural development. Even if savings were not the goal, we still believe that the time has come when the Gossner Mission should begin to look to Zambia for personnel to meet its commitment to GSDP.

With improved conditions for Zambians there should be a lessening of the barriers that now exist between staff members in the different categories. The direct recruitment of Zambians by the Gossner Mission would reduce the contract between the Gossner Service Team and the GSDP staff as a whole. Moreover the Gossner Mission would be contributing directly to the build-up of a cadre of trained people able to maintain development with Gwembe after the demise of the GSDP.

3. The staff meetings.

At the present time other than the one-to-one interaction between counterparts on the job, the primary field of professional interaction among staff members is at staff meetings, and other meetings such as that and the Executive Committee of the VSP in which a number of staff members participate. The meetings tend to be long, wordy, and sometimes demoralizing.

The structure and functioning of the meetings seem to be loosely parliamentarian, but parliamentary procedures are not followed with respect to maintenance of control over discussion. The Chair should take the initiative in requiring members to stick to the agenda and in seeing to it that items on the agenda are covered. It would assist the chair to do so, 1) if the agenda could be prepared and posted several days in advance, 2) if members could have a copy of the minutes of the previous meeting, and 3) if the Chair would rule out of order the reopening of questions settled at previous meetings or elsewhere on the agenda.

The secretary needs to work closely with whoever is chairing the meeting in working out the agenda. They should place items so that the most important matters are discussed when energies are high. Other devices to expedite discussion include the allocation of specified blocks of time for the consideration of different items on the agenda --10minutes, 30 minutes, as appropriate --to ensure that each one is adequately discussed. Currently, the first several items tend to preempt the meeting. A large clock placed where it can be seen by everyone helps to control discussion.

At any meeting, attention is likely to wander and is the discussion, especially when, as in this case, everyone is working in a second language. This strains attention and fosters misunderstanding. Beginning the meeting with a thirty minute coffee/tea period would give staff members a chance to meet socially before the business meeting begins and also allow for the inevitable delays due to difficulties in transport. After having had a chance to exchange shop-talk, those attending a meeting are less likely to indulge in unnecessary length comments as the meeting develops. If the meeting continues for a considerable period of time, some break and refreshment are needed.

What happens at this point will affect the subsequent tone of the meeting. If what is served contains a large amount of sugar and this is taken on an empty stomach, people tend to react with what is called a "sugar high" in about thirty minutes to one hour. Productivity may be high at that point, but it is rapidly followed by a low. This can result in the meeting breaking up with participants feeling exhausted, dissatisfied, depressed, or angry. This is less likely to happen if some protein is served during the break, groundnuts being one good source, along with fresh fruit and tea or coffee.

Better organisation (including careful agenda planning) better time allocation, and better planning of the break might do much to overcome the present feeling among many staff that meetings are a waste of time and lead to unpleasant encounters with other staff members. The staff meeting should be a means of informing colleagues about what is being done and obtaining their advice and cooperation in further work.

4. Training

We have already dealt with this in the sections devoted to expatriates and Zambian staff. We believe that orientation of expatriates is better accomplished through rapid immersion in rural life and local working arrangements than through an orientation course which is likely to perpetuate a series of myths about the whys and hows of local response.

Training of Zambian counterparts who will ultimately maintain various aspects of the GSDP's programmes so far has been minimal though some training has taken place. This is one of the major failures of the GSDP.

We recognize that it faces special problems with respect to training programmes for non-civil servants since special financing must be obtained. Here Gossner Mission inputs could make a significant difference, and providing such training should be given priority even over the recruitment of additional expatriates. The major thrust of the next period should be in furthering the skills of local people in preparation for handing over, rather than in using foreign skills to foster projects which cannot be maintained when the expatriates leave. This fact may be overlooked if GSDP becomes an IRDP with major investment in electricity and improved communications through better roads and lake transport. But we would argue that in that event a budget item to cover training is even more crucial, given the greater demand for trained personnel in the future.

If possible those chosen for training should be Gwembe men and women, who are most likely to be willing to make their careers in Gwembe. Granted the present financial crisis within the government, Gossner Mission funds are needed for the future training of both government officials seconded to the GSDP and of Zambian staff hired directly by the project. Where training is recommended by the GSDP, currently it takes too long for special funding to be obtained through the Gossner mission, with the result that the Zambian staff become demoralized.

B. Interaction with Other Government and Development Personnel and the need for a GSDP Contingency Fund.

Under this topic we include interaction not just with government personal in the various ministries but also with District Council staff and Councillors and with other development personnel (including other Zambian citizens and expatriates associated with development projects within Gwembe South, Gwembe District, and Zambia as a whole). In general such interaction has been deficient in the past. The GSDP has been permitted to go pretty much its own way according to its own interests and the individual interest of its staff. This situation will change as the District Council becomes the primary planning and implementing agency for the district. Already the trend is to work more closely with government departments operating within Gwembe South and with the District Council. Three Agricultural Assistants on secondment are working closely with Gwembe South Development Project personnel on the three irrigation projects, while collaboration with the District Council has also existed in the past in connection with the Water Development Programme.

We strongly endorse this trend, which we believe should be extended to other government departments. As decentralization proceeds, one can anticipate an increase in development staff within Gwembe South.

Until the economy improves one can also anticipate that available funding will be insufficient to enable many of these staff members to carry out the work for which they were trained. The GSDP can facilitate the work of such personnel not only by cooperating closely with them but also by helping to eliminate bottlenecks which restrict their effectiveness. There is already a precedent for this approach since the Gossner Mission provided K1000.00 during 1981 to enable a series of mobile and fixed courses to be carried out by the staff of the Buleya Malima Farmers Training Centre. Without such help, the same staff has been unable to hold any course to date during 1982.

Looking to the future, we suggest three approaches. First that each activity pursued by the Gwembe South Development project include both GSDP staff and, where, relevant, ~~government and District Council staff on secondment~~. This will not only improve co-ordination and avoid duplication but it will also improve the effectiveness of all involved. Logical activities for seconded personnel include Dryland Farming and Livestock Development as these activities are outlined in subsequent sections.

It does not make sense to second government/district Council personnel to the GSDP unless they are associated directly with GSDP staff in carrying out specific development activities. This is simply because where they are working alone they are less apt to have access to such necessities as transport and fuel and they are more apt to become isolated and ineffective. For this reason the Coordinator/Administrator should become the counterpart to the planner.

Second, we suggest that the Gossner Mission seriously consider making available to the GSDP a contingency fund, initially perhaps of K10,000, which can be used to assist development activities halted because of relatively small cash shortages. There are many activities which could benefit from small cash infusions. At the moment relatively small sums would enable the Farmers Centre to hold courses. Approximately K1000 would enable the Department of Fisheries to launch the rig that it has designed and constructed for possible use by local kapenta fishermen. In both of these cases major benefits could accrue to the people of Gwembe South. Furthermore, such help might be designed in such a way to assist GSDP activities directly. For example, the Farmers Training Centre could use the grant for courses relating directly to the irrigation, dryland farming and livestock activities of the GSDP. In return for help on the kapenta rig, the Department of Fisheries might be able to make dried kapenta available which then could be used to assist local people to become fish traders.

Third, we suggest better liaison with other agencies and personnel interested in Gwembe Development (or in developments of relevance to Gwembe) might prove mutually beneficial. In Gwembe North the Zambezi Training Farm is again about to give courses to irrigation farmers from the Middle Zambezi Valley and plans to re-organize the irrigation scheme at the confluence of the Kafue River with the Zambezi. Although this scheme is within Gwembe District and is electrified we do not believe there have been visits between Zambezi Training Farm and GSDP technical personnel, nor between the farmers involved. Yet presumably such visits could be extremely beneficial, as could visits and information exchange with other projects. Now that independence has come to Zimbabwe, a number of development projects are being planned for the areas directly across the Lake from Gwembe South. In this case, the accumulated experience of the GSDP could be especially relevant to the Zimbabwean authorities, while their plans could be of interest to GSDP.

C. Irrigation

I. Past and Present

Both expatriate and Zambian staff agree that irrigation development has been both the major thrust and the major success of the Gwembe South Development Project since its commencement. We agree with this assessment. Not only has irrigation development been a success in which the staff of the GSDP can justifiably take pride, but its history also provides useful lessons for future irrigation and other production activities. In the early years of the Siatwiinda project, management was largely in the hands of the GSDP with the result that farmers were apt to see the scheme as a government one on which they were employees. Once the farmers took over increasing control through their own Farmers' Executive Committee the situation changed rapidly for the better. Recently, when the lake level fell alarmingly low, The FEC called out the Farmers to deepen the intake channel on its own initiative-without the awareness of the GSDP agriculturist who found over 40 men and women at work when he arrived at the scheme. The farmers have also agreed to take over recurrent expenditure, although individually they are concerned about the high cost of diesel and the possibility of a shrinking profit margin. As for the Nkandabbwe Irrigation Project that is even closer to self-sufficiency since it has no pumping costs, while maintenance of the dam and channels is within the competence of the farmers.

We agree with the general consensus of the staff that the GSDP has developed among the people of Gwembe South a favourable orientation toward irrigation, with the result that villagers in both Chiabi and Simumpande have requested help to start their own projects. On the projects themselves appropriate crops have been identified, including those which can be marketed locally, reducing for the moment the problem of exporting surpluses. And the irrigation farmers have shown an increasing ability to manage their affairs and perhaps to pay recurrent expenditures,

2b. The Future

a. The Place of Irrigation within the Farmers' Production System, and the Size of Irrigated Holdings.

Granted the diversified nature of production systems within each Tonga household and homestead, we believe that irrigated holdings (including naturally irrigated zilili holdings in the future) should complement other production activities rather than being the sole or even major activity of household members. This is especially the case with dry land farming. Such an approach not only reduces the risk of hunger in an uncertain environment, but more people can have irrigated holdings if holding size can be kept relatively small. While we realize that an increasing minority of farmers can cultivate holdings larger than one lima (0.25ha.) and that they wish to extend their holdings, their growth can only be at the expense of younger farmers, who increasingly have access to little or no land. For this reason we believe that holding size should be kept relatively small and that Farmers Executive Committees should be encouraged to recruit as new plot holders suitable Grade 7 leavers, including both men and women, who have shown a willingness to work hard.

Though we are not in a position to recommend holding size, conversations with farmers, agricultural officials and GSDP staff would appear to suggest that 0.10ha. per household is sufficient for vegetable cultivation and 0.25ha. per household is sufficient for cereal cultivation. In years of poor rainfall, yields or income from such holdings are sufficient to support the household while in years of adequate rainfall for dryland cultivation, such irrigation plots contribute savings for the purchase of cattle and, in some cases, the initiation of business enterprises. Against this background, it would appear most holdings on future irrigation projects should not exceed 0.25ha. per household.

b. Size of Irrigation Projects.

So as to spread the benefits of irrigation over the largest area, it follows that initial emphasis should be on a larger number of small projects rather than on one or two middle sized and large projects. Furthermore, if holdings are kept to 0.23ha and below, small projects of 1-2 hectares can serve up to 10 to 20 households which would justify the construction (or rehabilitation) of small weirs at the base of the escarpment or in hilly areas, experimentation with small sub-surface dams in the lowlands, and further experimentation with handpumps for use under a wide variety of conditions including Kariba forshore cultivation at Kafwambila (but with a wider range of crops). The phrase 'initial emphasis' does not preclude, in the future, the development of larger projects in such areas as Buleya Malima (although such would require electrification) or within appropriate draw down areas.

c. Local Involvement of People

The history of both the Siatwiinda and Nkandabbwe projects clearly shows that villagers must be involved from the start in the planning of future irrigation projects. They also must be involved from the start in their implementation, management and evaluation. This recommendation does not mean that the GSDP should sit back and wait for requests from the people for irrigation assistance. In some cases (drawdown cultivation, for example), the GSDP may have to take the initiative by pointing out the potential to the people and explaining what is involved in realizing that potential. Thereafter it would be up to the people to decide whether or not to go on with a project.

d. The special case of drawdown irrigation

We have already described how the zilili area along the shores of Lake Kariba (and particularly the area between each year's high and low water levels) remains the major source of underused arable land within Gwembe South. Since its initial development by the Gwembe people requires some liaison with the National Irrigation Research Station, FAO and the Central African Power Corporation, soil surveys and the laying out of the better zilili lands into working plots research, and extension, we believe that the GSDP should play a major role in its development. Certain suggestions as what needs to be done follow:

(I) Liason with the National Irrigation Research Station (NIRS), FAO, and the Central African PowerCorporation (CAPCO)

The National Irrigation Research Station is increasingly involved in small scale irrigation projects in different parts of Zambia. It is a research resource of importance to the GSDP.

Liason with FAO should be established for at least two reasons. First, FAO already has considerable experience with the utilization of drawdown areas in other large African man-made lakes. This is especially true of Lake Volta in Ghana where a research and development project was implemented. Second it is important to liaison with FAO from the beginning in case an FAO executed project is implemented in the Chiabi area.

CAPCO has an excellent forecasting system for estimating the volume of water expected to enter Lake Kariba during each rainy season. From these estimates, they should be able to let farmers know the approximate date when the reservoir can be expected to drawdown. Though we have handed over to the GSDP and the NIRS detailed data on Kariba Lake drawdown since 1972/73 it makes sense for the GSDP to check our conclusions directly with CAPCO and to establish communication with CAPCO. There are CAPCO offices in Lusaka, Kariba and Salisbury. The Deputy Chairman is E.S.S. Nebwe who is from Sinzzeze.

(2) Soil Surveys and Layout.

Soil surveys are needed in order to designate the best areas for drawdown cultivation as opposed to grazing for live-stock; these two forms of land use need be assessed in relationship to each other, so that zilili areas:

- (a) do not break up important grazing tracts;
- (b) are laid out in such a way as to minimize the amount of protective fencing needed.
- (c) emphasize long strips extending vertically through the drawdown zone.

At least initially only a very small proportion of grazing land would be converted to zilili cultivation. Nevertheless local communities should be fully involved in deciding who should use what land. It might make sense to start with the drawdown area in front of Siatwiinda Irrigation Project in Senior Chief Mweemba's domain along with a suitable area in Sinazongwe's Chieftaincy.

(3) Research

Here we have in mind not so much research into appropriate crops (for the Gwembe Tonga already have a farming system for zilili lands while much of the research carried out at Siatwiinda Irrigation Project is also relevant), but rather research on special-problems such as the control of elegant grasshoppers (probably *Zonotrichia elegans*) and the best type of fencing to control cattle and hippo encroachment. On the other hand, some further crop research may be called for, including the suitability of improved floating rice during the period when the lake level is rising. If such rice can be grown that would allow double cropping. NIRS can provide valuable advise and assistance here.

(4) Extension and demonstration

Though the Gwembe people have undertaken zilili cultivation for hundreds of years, cultivation of the Lake Kariba zilili areas is different in a number of respects from zilili cultivation along the Zambezi banks. First, the soils are different being derived primarily from Karoo sediments as opposed to being relatively recent Zambezi alluvia. Second, the cultivation season will start later, in June-July as opposed to April-May. Third, because variations in lake level from years to year due to varying Zambezi inflows, the drawdown area will vary vertically from one year to another in terms of its location. For example, this year the lower portion of the drawdown area will include areas which are normally flooded during other years. The implications of these differences need be explained to the people by extension officers especially since it has important implications for the layout of land holdings. Demonstration of appropriate production techniques and layouts can be done on such pilot areas as the extension of the Siatwiinda Irrigation Project into the drawdown area.

None of the four tasks outlined above require much capital; nor are they particularly time consuming. Liason with NIRS, FAO, and with CAPCO can be handled by either the liason officer

in Lusaka, the coordinator-administrator at Nkandabbwe or the planner who is expected in 1983. As for soil surveys and layout, that involves mainly organizing the villagers and emergent farmers in the relevant areas. They already have a good idea of the most appropriate cultivation areas and they must be the ones to designate and layout appropriate zilili areas. As for research and extension, both can be included within current activities of the Gwembe South Development Project and Ministry of Agriculture and Water Development without major increase in either funding or staff. Should FAO execute a drawdown project in the Chiabi area that will of course involve valuable research which can be applied elsewhere. But such a FAO effort is no substitute for GSDP involvement now in drawdown cultivation. First, the FAO project may never materialize since it depends on improved road system to Chiabi. Second, even if the project does materialize it may take years before it becomes operational. Third, regardless of what happens at Chiabi there is a need now to develop small suitable zilili areas along the lake shore margin of Gwembe South such as can be used by school leavers.

D. Dryland Farming

Through the members of each household try to diversify their production by participating in a range of ~~activities~~
dryland farming continues to be the most important activity
for producing both food and income for the largest number
of people in Gwembe South. Its relative importance can be expected to continue throughout the rest of this century. If the GSDP is to affect the lives and livelihood of larger
of people than has been the case to date, far more attention
than in the past must be paid to dryland farming.

Though the Gwembe Valley is the hottest portion of Zambezi with the least precipitation and the shortest rainy season, the climate of Gwembe South is not unlike that of much of Africa including portions of Kenya and Tanzania and the entire West African and Sudanic Sahel. Perhaps the ~~other~~ greatest challenge in tropical African agriculture is to come up with an improved farming system for this vast region. In the Gwembe as elsewhere it is becoming increasingly clear that the starting point is the existing production system at the household and village level. Historically this includes cereal crops along with legumes, oil crops like sesame, and cucurbits with crop cultivation integrated with animal husbandry. The cultivation of a variety of crops in different garden types, with considerable interplanting of food crops in such a diversified system basically is sound.

In recent years various cash crops like cotton and sunflower have been added to the dryland farming system in Gwembe while the proportion of farmers using animal traction increased significantly during the late 1960s and the early 1970s. (This may no longer be the case; indeed in Gwembe North the proportion of farmers using oxen for cultivation as opposed to hoes has decreased in recent years owing to the spread of bovine trypanosomias)

These trend should be encouraged, along with the further diversification of the farming system through the addition of small irrigated plots, fruit trees, and wood lots where possible. Though there has been recent concern about the increase in cotton production at the expense of cereal production, we believe that the main problem here has been not so much an over emphasis on cash crops but too little emphasis on cereal and other food crops. There is ample room for increased production through better pricing policies, the introduction of early maturing cereal varieties, and the extension of more intensive production techniques including fencing, tie-ridging and the application of manure.

a. A logical starting point is a greater emphasis on sorghum which grows well in the Gwembe Valley even during years of low and irregular rainfall. Current prices for sorghum are far too low. If the price was raised to that of maize, this single measure would go a long ways toward reducing cereal shortfalls within the Gwembe. At the same time it should serve national interests since sorghum flour can be incorporated within bread hence saving foreign exchange through reduction of wheat imports. Sorghum can also be substituted for maize in the production of animal foods and in the brewing of chibuku. Hence leaving more maize for human consumption in bad years. Early maturing red flammida sorghum has fine malting properties. It was actually grown as a cash crop by the Gwembe people in the early 1970s but production virtually stopped because of pricing policies.

As for improved extension services, extension is best carried out in the farmers' fields for then the extension agent can learn at first hand about the farmers' problems reducing the risk of trying to extend impractical advice. For this reason we believe that the dryland farming programme proposed for the next five years by H. Fuchs of the GSDP staff is basically sound. According to the Fuchs' proposal, each of the two GSDP agriculturalists would work directly at the village level with an Agricultural Assistant a counterpart. In each village "they would teach about Lima-Programme, animal husbandry, erosion control, fruit trees, vegetable gardens, handpump gardens, etc." In each village the extension workers can see the special problems and advise villagers on the building of latrines, grain stores, dams, wells and other social amenities. Follow up work would continue at fixed intervals over a complete annual cycle.

While this proposal is a good one, we suggest the following modifications:

1. That the Department of Agriculture second an AA to work with each of the GSDP agriculturalists, preferably selecting the AA from the area in which the extension work is going on.

2. That the GSDP female extension worker also work primarily in the villages in which the agriculturalists and AAs are working. A trained AA who is a woman should be seconded to work with her, because Gwembe women are farmers and stockowners in their own right.

3. That the villagers be involved in the selection of the initial villages. As with all new programmes, it is best to start cautiously with flexible procedures which will enable the staff and the villagers to learn from their experience. The first villages selected should be ones in which men and women as farmers are not only well disposed toward the programme but also wish to participate themselves.

4. That the Farmers Training Centre at Malima be involved in the programme through the offering of mobile courses in the villages concerned, especially follow-up courses after the GSDP team has moved on to a new set of villages.

There is a urgent need to make available within Gwembe South appropriate early maturing varieties of maize, millet and sorghum. Though SK 52 is the major seed maize throughout the rest of Zambia, it is an inappropriate variety for Gwembe. Though more appropriate varieties exist (like pioneer and new Zimbabwean varieties, and perhaps SR 11 and SR 13), enough. The GSDP could play a major role if it could liason with ZAMSEED and Mt. Makulu to ensure that appropriate varieties are available for use in the Gwembe. The same applies equally to early maturing varieties of sorghum and bird resistant varieties of millet. If certified by ZAMSEED it might be possible for the better emergent farmers in Gwembe South to produce seed in bulk, ensuring its availability.

E. Livestock

1. Livestock within the Gwembe South Economy.

Livestock are already integrated within the farming systems at Gwembe South with most farmers wanting to plough their lands with oxen. Thought of as wealth (hence the general term 'lubono' for cattle sheep and goats), Domestic animals are seen as a valuable form of savings. Increasingly they are also seen as a cash crop to be sold on an annual basis rather than just on special occasions, although before annual sales make sense herd size and composition must meet the farmer's needs for oxen trained to plough.

In recent years, there appears to have been a significant increase in illness and deaths among Gwembe South livestock owing to a wide range of causes. Among cattle these include liver fluke, quarter evil, and scabies. Bovine trypanosomiasis is also there and must be continually monitored and controlled. This disease currently is the major cause of cattle deaths in Gwembe North where perhaps 30% of the Lusitu herd has died within the past 12 months due to the spread of tsetse flies. As for small stock, scabies in the 1970s devasted entire herds of goats in parts of Gwembe South while numbers of sheep have declined everywhere in Gwembe since Kariba resettlement.

The people of Gwembe South are very concerned about the incidence of illness among adult stock and about high calf mortality. Like owners of livestock throughout Africa they want improved health for their animals. Some emergent farmers villagers have already begun to purchase medicines from the private sector. Others no doubt are ready to follow their example.

2. The Need for Research

There is a further need for certain types of research. Reports on Gwembe livestock frequently mention overgrazing and conclude that the Valley's carrying capacity for both cattle and goats has been exceeded. Certainly overgrazing occurs in some areas, and in Gwembe North at least it contributes to a higher death rate in years of inadequate rainfall. Elsewhere in Gwembe, inland from the lake, a serious lack of water for stock occurs toward the end of the dry season. On the other hand, there is little evidence that the Gwembe Valley as a whole or Gwembe South specifically is overstocked. Without exception, reports suggesting that the valley is overstocked have failed to consider the high grazing potential of the Lake Kariba foreshore including the drawdown area. Given the availability of this resource throughout the year, the problem of seasonal overgrazing in Gwembe South is more a problem of the distribution of livestock than total numbers of stock. Many Gwembe Tonga already realize this. During the dry season cattle grazing the Kariba foreshore from nearby villages may be joined by cattle driven down to Lake Kariba from such inland areas as Siameja, again showing the capacity of the Gwembe people to adapt to new problems by exploiting new opportunities.

We are aware of no research on the carrying capacity of the Kariba foreshore at different times of the year. Clearly such research is badly needed. Research is also needed on the seriousness of the liver fluke threat and on the problem of scabies in goats which appears to be able to wipe out entire herds periodically. Another possible research topic relates to reasons behind the significant decline in the sheep population since resettlement in the 1950s. Throughout Gwembe calving rates seem low and calf mortality high. There is a special need for research on this topic, with the results of research extended directly to village and emergent farmers by the GSDP.

3. The GSDP and Livestock.

To date the Gwembe South Development Project has not offered services with respect to cattle, goats or sheep, though some attention has been paid to pigs. Though various proposals have been discussed, with a major report (the Bruns report) submitted to the Ministry of Rural Development in 1975, there has been little follow up by either the Government or GSDP.

Consistent with our belief that the major focus of the Gwembe South Development Project during the next five years should be on intensifying and further diversifying the existing household and village production system, we suggest that the

The GSDP include livestock development among its activities. The approach here should be to further integrate cattle husbandry with cropping through improved access to healthy oxen; to increase awareness of the appropriateness of cattle within the Gwembe Valley as a cash crop (as opposed to a form of savings); to assist in developing a more reliable and regular marketing system of cattle through the Cold storage and private buyers; and to emphasize goats as a cash crop. In considering our suggestions, it need be kept in mind that in areas like Siameja, livestock are probably the most important part of the farming system in terms of meeting the people's cash needs. Because of high population densities and poor soils outside the Lwenda basin it is unlikely that this area can meet its food needs by growing. Hence the crucial importance of helping the livestock industry develop along with fishing and wage employment in nearby mines. In stating this, it is important to include goats as well as cattle in any development programme (and to lesser extent pigs and other livestock). As Bruns has pointed out, the Gwembe Valley is a paradise for goats, including in 1975 over 50 percent of the entire goat population of Southern Province. Today sale of goats is profitable for both the farmer and the buyer, a good sized castrated male selling for K14 in the Valley and for over K36 on the Plateau. Though no butchering of goats is reported in the statistics for Maamba, that township ought to be a good market for goats.

4. Staffing the GSDP for Livestock Development.

Here there are three possibilities. One is to provide financial assistance to the relevant government departments and officials in order to facilitate their current work and to encourage them to work more closely with the GSDP (including, for example, the dryland farming proposal suggested by Mr. Fuchs). A second possibility is to second to the GSDP a Livestock Officer or a Livestock Development Officer to work closely with GSDP agriculturalists female extension workers (including both seconded government personal and expatriates). The third possibility is for the Gossner Mission to recruit directly to the project a livestock specialist who can work closely with a government counterpart seconded to the GSDP. We favour the third alternative, and suggest that the livestock specialist be recruited from within Zambia (or at least within Africa), rather than in Europe for the reasons outlined in Section III, A: The staff and GSDP Dynamics. Since recruitment of staff takes time, in the meantime we suggest that the first possibility be implemented at the earliest possible moment.

F. Fishing.

Because of the historical importance of fishing in the development of the Gwembe South economy and the current potential of fishing to contribute in a major way to future development, we believe that the Gwembe South Development Project should participate in the revitalization of the local fishing industry (the potential and problems of which have already been outlined in Section II. D: The Changing Natural Resource Base.)

Though the GSDP has not implemented any fishing activities to date, the recent transfer (February, 1982) of the Department of Fisheries from the Ministry of Lands and Natural Resources to the Ministry of Agriculture and Water Development should make an integrated approach to agriculture and fisheries easier. The GSDP might help in the following ways:-

1. Help the Department of Fisheries carry out more effectively its current responsibilities in fisheries research and development. Since the relevant staff are present in the department this can best be done through financial assistance. For example, the GSDP could contribute to the construction of a kapenta rig which can be used by local fishermen. Such a rig is nearing completion at the Sinazongwe Fisheries Training Centre but its launching has been delayed because the centre has no money to buy resin for finishing the rig.
2. Help local traders enter the kapenta fish trade by providing, through the VSP, loans of approximately K100 to enable Gwembe residents begin trading by purchasing at the lake shore a 20 kilo bag of kapenta for transport and resale elsewhere. The VSP could also employ people as traders. In this case the profits from the fish trade could be placed in the VSP revolving fund to help them and others to become independent traders. Looking to the future, participation in the kapenta fish trade could provide a major and much needed source of steady income to the VSP.
3. Continue current investigations on how the Gwembe people can participate directly in the current large-scale commercial kapenta fishery. Since we do not believe such participation can be done by villagers or through the development of fishing cooperatives, possibilities include ownership of rigs by the District Council or the VSP. However, the financial outlays involved are considerable, so that failure could jeopardize the very existence of a young institution like the VSP. For this reason very careful planning is essential.
4. Establishing a special revolving fund for equipping carefully selected Grade 7 leavers other men as fishermen, with loans restricted to net purchase, or if larger sums become available to nets and boats (but not engines.)
5. Assist with re-establishing a lake transport system for carrying fish from outlying camps to such marketing points as Siatwiinda and Sinatandabale-Sinazongwe from which they can be transported elsewhere by road. Since such a system is needed throughout Gwembe District it makes sense for the GSDP to work closely with the District Council which ran such a service in the past. Lake transport also presents possibilities for the VSP although again very careful planning is necessary, granted the considerable financial outlays involved.

The Zambian staff of the GSDP already have considerable Lake Kariba fishery experience. For this reason, we doubt that the type of fishery assistance suggested above requires the recruitment of other expatriate. Depending on the size of its fishery activities, the GSDP may wish to recruit an experienced Zambian who would then work closely with a Department of

Fisheries counterpart seconded to the GSDP.

G. GSDP Assisted Institutions.

The GSDP has been instrumental in the creation of a number of local institutions which are semi-independent and may become totally independent. Each has its own staff and its own sources of funding and is subject to the control of a general meeting composed of its members. Creating these institutions is a major achievement, even though it is unlikely that all of them will survive through the next decade. It is easier to install physical structures than it is to build the institutional framework that will maintain programmes, and the difficulties of building institutions is the major problem faced in all development efforts. In Gwembe South, the GSDP has succeeded in the face of the local preference for individual enterprise and ad hoc arrangements to achieve particular goals, and lack of trust in group action.

The key organizations are the Valley Self-Help Promotion Fund (VSP), which coordinates a number of different enterprises, the Gwembe South Builders (GSB) the Irrigation Farmers Executive Committees (IFEC), and the Credit Unions. Comparable organizations do not exist in Gwembe North (aside from a credit union at Siavonga) or Gwembe Central today -- earlier attempts at founding cooperatives all foundered within a few years, there as in Gwembe South. That such organizations exist in Gwembe South is due to the GSDP, which from the beginning has tried to foster local initiative.

The GSDP has also experimented with study groups and a variety of self-help organizations. The structure of the VSP and other GSDP inspired organizations reflect a past GSDP belief that cooperative behavior of some kind is preferable to private enterprise, and so is in line with Zambian policy. The current GSDP effort to assist people with cooperative organizations requested by them, makes more sense, since any attempt to press the Gwembe people further into the cooperative mold is likely to meet with loss of interest on the part of members who are concerned with their own immediate advantage rather than with the long-term benefits assumed to derive from a building of community. They may well feel that they have all the community they can bear already. Producer's cooperatives and other forms of cooperatives have not previously been successful in Gwembe, and producers' cooperatives have a dismal record almost everywhere. Organizations which have simple easily attainable goals and which can be disband when these goals are realized may well be those most likely to generate local response and achieve results.

1. The VSP.

The VSP was founded in 1979 as a means of obtaining foreign funds for self-help projects, after it became obvious that the Zambian Government could no longer support the building of schools and clinics or the provision of water supplies.

The GSDP also wished to turn over to a non-profit organization a number of enterprises, such as the Tonga Craft Programme, which were expected to be self-supporting and generate profits, that could be poured back into Gwembe Development through a rotating loan fund to provide credit to local businesses; and through self-help community programmes.

The VSP is governed by a general meeting, attended by the two chiefs of Gwembe South and local notables and by representatives from various organizations which have been asked to accept membership in the society; local churches, farmers' associations, credit unions, the Gwembe South Builders, and the GSDP. The general meeting elects an executive committee and also its chair and vice-chair, and so chooses those who control the working of the VSP. The executive committee decides on new enterprises, makes loans, hires a coordinator, who in the future should prepare the budget.

Currently the VSP has not achieved full independence. It is not clear how much of its programme is inspired by expatriates serving on the Executive Committee or what would survive its activities if the Gossner Mission withdrew. It relies upon the expatriates staff for its treasurer and is largely funded through foreign donations, principally in the form of second-hand clothing sent by German and Dutch supporters of the Gossner efforts for sale locally. Funds from these sales provide much of the funding for self-help programmes, such as the extension of the Kanchindu Clinic, and also help to subsidize some of the other enterprises which fall under the VSP umbrella. Overseas funds also provided for the purchase of a lorry, which ought to generate income through hire to local enterprises now starved of transportation but currently a financial liability.

If the VSP is to survive, it needs to develop good projects which will generate a profit. It needs to rationalize use of its lorry and develop a profitable transport business. This is not impossible given the shortage of vehicles in Gwembe South. It should be possible for the various enterprises under the VSP to coordinate the purchase of supplies to be brought from the railway line so that the lorry moves with a full load to and from the line of rail rather than make a number of trips at high cost. Local businessmen currently are unwilling to hire the lorry to transport stock because each one is expected to deal independently and pay the full cost of the journey to Choma and return. The VSP staff might well organize a distribution system which would permit a number of local businessmen to move stock or produce at the same time, thus minimizing the cost to each. While there is a reluctance on the part of some members of the VSP Executive Committee to have the VSP lorry compete with local transporters, the lorry is an expensive toy for the VSP unless it can earn its keep and provide funds for a replacement. Either it should show a profit, or it should be sold now when it still has some monetary value and the money realized be used in strengthening other enterprises. We suggest elsewhere that the VSP might be the means through which Gwembe people could participate in the kapenta fisheries.

The kapenta rigs in use are probably too expensive for individual Gwembe fishermen, but the VSP might finance a rig or rigs. It could sell its catch through local traders, who would undertake to distribute kapenta through local shops as well as on the line of rail. The traders might need to be given initial loans to cover the cost of their first purchases of kapenta from the VSP and from the commercial fishermen who now monopolize the fisheries. The profits in the trade, however, are such that the loans should be recoverable. With some coordination, the development of the kapenta trade could also contribute to the financial success of the transport business based on the VSP lorry. The VSP should also consider investment in the processing of a wider range of agricultural products through the use of grinding equipment, oil expressors and other technology appropriate to the Valley which the VSP either owns outright or finances through its loan programme.

Currently the most successful of the VSP enterprises is the Tonga Crafts Programme, which was handed over to the VSP as a going concern. This is a major source of income for the people of Kafwambila and certain other remote areas which have small chance of cash cropping or wage labour. It also maintains a tradition of craftsmanship which provides necessary equipment for Gwembe households. Throughout Gwembe, the shortage and high cost of commercially available utensils and tools have led to a revival of village crafts, but it is only in Gwembe South that local craftsmen can expect a regular sales outlet for their products. The Tonga Crafts Programme should be maintained and expanded. The purchase side of the programme is already well organized, and the demand for quality products has if anything improved the local standards of craftsmanship. Marketing, however, needs to be improved and should not continue to rely primarily upon the shop presently housed at the Gossner premises at Kabulonga on the outskirts of Lusaka. When the Gossner Mission withdraws, this outlet will be lost. Furthermore it probably attracts only a small number of buyers, since only those who already know about it or see its sign posts at Kabulonga are likely to become customers. Better placed outlets would probably generate larger sales. Better stocktaking is also needed and purchases and sales prices need be re-evaluated (through the Crafts Programme operated at a profit during 1981, it is currently operating at a loss). Whoever is in charge of the Tonga Crafts Programme will need to be trained in management, accounting and marketing (the latter may mean learning how to contact overseas markets as well as arranging marketing with local and other dealers. The museum of Tonga Crafts at Sinazze is a useful mechanism for displaying (and advertising) Tonga craftsmanship.

A. Programmes for the sale of bicycle parts is a minor service provided by the GSDP which has been turned over to the VSP. In Gwembe bicycles are becoming scarce because people cannot get the parts to keep them in repair. It has become more difficult to transport patients to clinics and dispensaries, to transport luggage and other equipment, and to travel as a consequence. But provision of spare parts if these are available in Zambia, can probably be left to shopkeepers,

so that the sale of bicycle parts can probably be phased out once the current stock is depleted. The VSP Programme for making axes is probably best left for local craftsmen unless volume can be increased to restore profitability by sale to line of rail outlets. Local craftsmen probably can supply the local demand for axes, as they did in the past, using discarded hoe blades and other cast-off metal.

2. Gwembe South Builders.

The general consensus among those to whom we talked is that the Gwembe South Builders cannot survive as a cooperative once the Gwembe South Development Project is terminated. We concur with this assessment simply because there is no evidence to date that producers' cooperatives of any sort are available form of organization for the Gwembe Valley, whether composed of farmers, fishermen or builders. Looking to the future, there are two possibilities. One is to disband the Gwembe South Builders as an institution, with the employees (for that is what the individual builders consider themselves) seeking employment elsewhere or becoming self-employed. Since the Gwembe South Builders is a profit-making organization (under present management and since it has played a very valuable role in the construction of improved buildings for government departments), disbandment should be postponed until the termination of the GSDP. In the meantime employees should be encouraged to obtain further training, especially in the case of those who wish to establish themselves as independent builders in the future. Since the largest market for such independents in the village housing industry, it makes sense for the GSDP to pay more attention to the utilization of local materials (like kiln fired bricks) for improving village (as opposed to government) housing and outlying structures (including granaries), with the builders in the GSB trained to use these materials. In this way the current gap between village and government construction might be reduced in the future.

The second possibility concerning the future of the Gwembe South Builders is to hand management over to a Zambian who will incorporate the builders as a registered private sector business. Or such a Zambian could be hired to manage the GSDB under either the District Council or the VSP. We know such Zambians exist, including people from Gwembe District. In April one of us met such a man in Sinazese. He has his own company on the Copperbelt, submits his own tenders for government contracts and has employed up to 30 workers at any one time. Currently he is investigating the possibilities of shifting his activities to Chisekesi, Gwembe Boma, or Munyumbwe. Presumably he would also be willing to consider managing the Gwembe South Builders.

3. Irrigation Farmers Executive Committee.

The Committees at Nkandabwe and Siatwiinda are working well, and seem to be able to operate without supervision. Whether this will be true at Siatwiinda if the Committee takes over the management of the pumping system, paying for diesel and the salaries of the pump operators, remains to be seen. Already the increased water fees, which will be paid to the Farmers Organization to cover operating costs in the future, is a matter of controversy, as is the extension of the

Siatwiinda scheme into areas of dryland farming utilized by some of the plotholders on the scheme. These are demanding compensation. The Committee at Siatwiinda is also concerned about the cost of replacing old pipes, laid down at the time the irrigation system was first built in the early 1970s. If they are fully independent, they will have to contract for new pipes and other equipment, and arrange for the skilled technicians required in the repairs. Given that the Irrigation system failed during the rains of 1981-82 due to breakdown of equipment which could not be made good their GSDP advisors, they have little reason to have confidence in their own ability to obtain equipment from suppliers at a time of national shortages.

The Siatwiinda Committee therefore faces an uncertain future, adequately though it is functioning at the present moment. The Nkandabbwe Committee has the fewest technical problems to face as irrigation at Nkandabbwe is based on a simple gravity system which requires little more than their own labour of maintenance. The committees at Siatwiinda and also at Buleya Malima face much more difficult problems in the maintenance of their schemes. Probably they will succeed only if they can generate enough income to be able to hire skilled technicians to maintain the systems.

All the schemes face problems of marketing, which are only temporarily resolved by growing crops for which there is local demand. These might best be solved if the committees eventually could be federated into a Union, with new FECs added as other irrigation projects come into being. This would allow for economies of scale in marketing, and would justify the purchase of a lorry with which to tap more distant markets. We are aware that some of the staff of the GSDP oppose dependence on markets on the railwayline, but here we think they are being unrealistic. A federated union of irrigation farmers in Gwembe South could afford a better marketing system than currently exists, and pay more attention to what customers want. Marketing problems in the future may be partially solved by the construction within the Gwembe Valley of appropriate agro-industries (combining, for example, the canning of kapenta and tomatoes). In the meantime crops like rice and bananas can be profitably exported from the Valley as can locally grown tobacco (tombwe) and okra.

4. Credit Unions.

Credit unions in Gwembe South appear to have developed initially because the Siatwiinda irrigation farmers wanted access to credit. They will fill a need in Gwembe for savings schemes which pool resources and also safeguard them. There is no doubt whatsoever that Gwembe people save substantial sums. This has been proven again by the outpouring of cash at the time of currency changes. Bills and coins are hoarded against need, and we know of individuals who have had between K1000 and K1500 stored in the ground or hidden in granaries. The other favorite form of saving is through investment in livestock. Both types allow people to draw upon their savings easily. Savers are less likely to use banks and postal savings, because, given the distance that must be travelled to deposit or withdraw money, banks and postal savings are not

seen as giving liquidity. The small interest rates they pay do not offset this inconvenience; moreover people are aware that the return rate from investment in livestock is much better than the return rate on savings in banks or postal savings or building and loan societies. Credit Unions, to be successful in Gwembe, must be able to ensure liquidity, and at the same time conceal savings from the watchful eye of kin and neighbours. The rate of interest may be of less importance, given that deposits are in place of hoarding.

Yet there can be no doubt that Gwembe South needs easily accessible savings schemes to provide it with working capital and that credit unions can reach more people than banks and postal savings even if a number of branches of such institutions could be established within the region.

The principle obstacles to be overcome are the lack of trust which is endemic and reluctance to repay loans except under pressure. People rarely repay debts unless forced to do so and debts may run on for years until some crisis in social relationships between debtor and donor leads to a demand for repayment. This same expectation makes credit unions fragile arrangements once any large number of loans have been made. While the unions can depend upon expatriates they may survive since expatriates are assumed to be more trustworthy in the handling of funds than local people, and they also can press for repayment because they are not dependent upon the maintenance of long-term social relationships with other members of the community. If the credit union is to maintain itself after expatriates are withdrawn, there must be some overriding motivation on the part of its members.

We think there may be this motivation in Kanchindu/Siatwinda and a few other areas, where people see the advantage of being able to deposit, on a regular basis, sums in excess of their immediate needs. Fishermen, irrigation farmers and traders who receive numerous small sums which they fear to fritter away may have a special need of such arrangements, as do those who receive wages or salaries. Those who foresee some pressing need for a loan to finance the purchase of equipment or the payment of school fees at a time when they cannot expect any cash income also have an incentive to support a Credit Union. Those people who sell livestock to finance immediate purchases probably see little advantage to a credit union, as do farmers who receive the major portion of their year's income from sales at harvest time and immediately convert funds into consumer goods and new equipment.

Credit Unions therefore should not be pushed except where local people show themselves eager to form a union. Almost everywhere now there are literate men and women who can keep records and carry out the necessary transactions, so this is not the problem. But if they are young they will not have the influence to back up claims against debtors or to ease the fears of those who expect their fellows to take advantage of them. And they themselves may be reluctant to undertake responsibility for the money of others, given the distance from savings institutions in which funds can be