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HUMAN SETTLEMENTS

**DEVELOPMENT STRATEGIES AND REHABILITATION PROGRAMS FOR
THE PEOPLES AFFECTED
BY THE CONSTRUCTION OF THE KARIBA DAM**

Final Composite Report

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for

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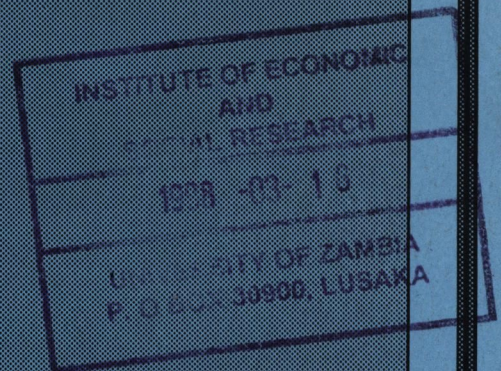


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List of Abbreviations

ADC	-	Area Development Committee
AIDS	-	Acquired Immune Deficiency Syndrome
ANOVA	-	Analysis of Variance
ASIP	-	Agricultural Sector Investment Programme
CARMATEC	-	Centre for Agriculture Mechanisation and Rural Technology
CBO	-	Community Based Organisations
ESAMI	-	Eastern and Southern African Management Institute
DANNIDA	-	Dannish International Development Agency
DEP	-	Development Education Programme
DHMT	-	District Health Management Team
FINNIDA	-	Finish International Development Agency
FHANIS	-	Household Food Security, Nutrition and Health Monitoring System
GDI	-	Germany Development Institute
GRZ	-	Government of the Republic of Zambia
GTZ	-	Germany Technical Assistance to Zambia
GVDP	-	Gwembe Valley Development Program
HIV	-	Human Immuno-deficiency Virus
IFAD	-	International Fund for Agricultural Development
IMT	-	Intermediate Means of Travel
IUCN	-	International Union for Conservation of Nature
JICA	-	Japanese International Cooperation Agency
MAFF	-	Ministry of Agriculture, Food and Fisheries
NCHS	-	National Centre for Health Statistics
NGO	-	Non Governmental Organisation
NTI	-	Non Transport Interventions
ODA	-	Overseas Development Agency
URI	-	Upper Respiratory Infection
RHC	-	Rural Health Centre
PDC	-	Project Development Committee
SADP	-	Siavonga Agricultural Development Programme
STD	-	Sexually Transmitted Disease
UBZ	-	United Bus Company
UNICEF	-	United Nations Children's Fund
UNZA	-	University of Zambia
VDC	-	Village Development Committee
WASHE	-	Water, Sanitation and Health Education
WHO	-	World Health Organisation
ZESCO	-	Zambia Electricity Supply Corporation
ZRA	-	Zambezi River Authority

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EXECUTIVE SUMMARY

Study Design

This report presents the findings of the study on the Development Strategies and Rehabilitation Programmes for the peoples affected by the construction of the Kariba Dam. The study was conducted in three districts- Siavonga, Gwembe, Sinazongwe and Kalomo and covered six chiefs' areas. Over 800 randomly selected households were interviewed using a questionnaire schedule to generate information pertaining to the Kariba dam construction and its effects on the people in the affected areas. In addition, the Participatory Rural Appraisal (PRA) techniques such as focus group discussions and observations were also used as a process of community involvement in project design and planning for the affected areas. This study addresses the problems currently being faced by the Gwembe Valley Tonga people as a result of the Kariba dam construction and attempts to identify areas in which ZESCO, with the help of a loan from the World Bank, could effect interventions.

The main issues covered in this study include: demographic factors and health conditions, the status of roads and rural transport infrastructure, land use and agricultural production, use of meteorological and hydrological data in recession agriculture and Spontaneous Relocation areas. In addition, the role of community participation in development activities was assessed and the factors hindering and enhancing community participation were examined.

Rationale and Background of the Study

The increase in manufacturing activities in Southern Rhodesia and the expansion of the mines in Northern Rhodesia required commensurate levels of energy for these economic ventures. Feasibility studies were conducted in the Gwembe Valley and the construction of the Kariba hydro-electric Dam was completed in 1958. At the time, very little attention was given to the long-term impact of the dam construction on the life pattern and livelihood of the displaced people. An estimated 57,000 Gwembe-Tonga people were displaced from their original homes in the valley and relocated along the lake shore, an area that was, and continues to be largely isolated from the main centres of economic activity in Zambia.

Completion of the dam's construction in 1958 resulted in the flooding of an area measuring 4,000 square kilometres. It was this flooding that led to the relocation of five traditional authorities, namely: Chipepo; Mweemba; Simamba and Sinazongwe. Chief Munyumbwe's area and Sinadambwe were not affected by the movements, while Sikoongo's was indirectly affected through playing host to communities that were relocated from Chief Chipepo's area.

The socio-economic consequences of the forced human movement have remained quite serious over the decades. These include the following:

- pressure on land;
- chronic crop failures among the people whose previously occupied area consisted of alluvial soils from the river systems that allowed the inhabitants to farm twice in a year and thus, enabled them to hedge against famine;
- poor water supply (for human consumption and for animals), particularly for those communities that are geographically distant from the lake shore;
- poor communication systems, a factor that further contributed to the areas' economic alienation; and
- unacceptably-high mortality rates as a result mainly of poor health conditions in the new settlements.

A closer look at some of the above problems would illustrate the magnitude of the problem.

Land and Land alienation

Following the relocation of communities, compounded by land alienation and the influx of foreign investors who are buying land along the Zambezi river and lakeshore, land shortage has become a major problem among the Gwembe-Tonga. The problem has worsened over the years. Repeated utilisation of land over the years and grassing pressures have turned areas such as Lusitu, Siameja and others into dust bowls with food shortages becoming common. In Siavonga, land speculators have fenced off a large portion of the lake shore, denying the local communities and their animals access to water and dry season grazing lands. This development caused the people of Simamba to lose a lot of animals during the past drought spells. The colonial authorities' assumption that with the construction of the Dam "the African population would be able to fish on a commercial basis and survive and rise above the subsistence level of their previous life," has been disproved by time as the Gwembe-Tonga have never been and still are not large scale fishermen. Agricultural production is their major occupation and in the event of landlessness as is the case now, they strive to eke out a living on marginal lands resulting in land disputes and lawlessness. Land loaning has become common especially in the overcrowded Lusitu area. The pressures on land have also resulted in environmental degradation marked by the deforestation and loss of the riverine.

Water

The quality (and quantity) of water in many places has remained a perennial problem for the Gwembe-Tonga. Although boreholes were sunk throughout the valley following the dam construction, water shortages are still widespread. The boreholes sunk were insufficient in some cases and in others, the water was of very poor quality.

Furthermore, some of the boreholes were not properly constructed and dried up after a short while. In Siavonga, for instance, out of a borehole population of an initial 84 water points, only 34 are currently yielding water.

Commercial fishing

Whereas it was widely anticipated that the construction of the lake would open up opportunities for the Valley people, this has generally not been the case. The assumption that people would suddenly and smoothly shift from their long standing tradition as subsistence farmers and become large scale fishermen has been proved to be incorrect. The Valley people have remained largely agricultural-oriented. Their involvement in fishing is still minor.

Recent efforts to relocate local people interested in fishing into fishing camps was resisted since locals refused to abandon their homesteads to go and live side by side with 'strangers' from other parts of the country, mainly from Western and Luapula Provinces. The regulation of fishing areas around the dam has further aroused anger among the locals who, paradoxically find themselves being alienated from the resources of a dam whose construction cost them lives, negatively altered their lifestyles, diminished their means of livelihood, overnight submerged their treasured shrines and separated kith and kin across the Zambezi. It does not take much imagination to appreciate the anger, despondency and frustration that one comes face to face with as you traverse the valley.

Main Findings Of The Study

Delivery of Services

The growth of local and international NGOs in Zambia has been quite rapid in the past ten years. This fast growth means that NGO's capacity to effectively work with the communities is still limited. There is, therefore, a recognised need to strengthen their skills at financial mobilisation and management, as well as at the levels of project planning, implementation, appraisal, monitoring and evaluation. There is currently the NGO Technical Services which is trying to equip other NGOs with these skills. There is also the NGO Co-ordinating Committee that attempts to harmonise their activities. Moreover, donors are increasingly indicating willingness to utilise NGOs.

With the advent of democracy and liberalisation in the country, it has been argued that NGOs can play an important role in utilising donor resources for development. The Zambian government has accepted, in principle, the channelling of donor resources directly to NGOs when this is found to be the most effective method of service delivery. For example, in the government's 1993 technical co-operation policy statement, it was stated that resources can be channelled through NGOs. Multilateral institutions have, thus developed a number of programmes that specifically target NGOs directly. The European Commission is one good example that has explicitly done this. Others include the World Bank which, through the social recovery project, funds community based

organisations. Under this type of funding, the World Bank disburses resources to project committees that, in turn, are accountable to the Government's Micro-projects Unit that is based at NCDP.

Presently, the Gwembe area is served by a multiplicity of Government, NGOs and international organisations which provide services in the fields of education, health, agriculture and land use. The Department of Agriculture, for example, is currently involved in programmes of crop diversification, farm management, and seed multiplication. Similarly, The Ministry of Environment and Natural Resources is currently undertaking environmental activities which include soil conservation and agro- forestry extension programmes.

Mainly because of the weak delivery capacity of Government units, there has been a proliferation of NGOs in the Gwembe Valley that try to help the local communities. Among the NGOs currently active in the Valley are Harvest Help; World Vision International; Development Education Programme; CELIM; AFRICARE; Water Aid; PAM; Gossner Service Team, and other Church organisations. International organisations include the European Union; FINIDA; DANNIDA; JICA; UNICEF; IFAD; and ODA.

Demographic parameters and Health conditions

Population and health factors are among the set of parameters that can be used to gauge the socio-economic experiences of a given population. The life changing experiences that the people of the Valley have undergone have altered their family building practices. The forced migration movements triggered by the Dam's construction resulted in dislocation of people from their original homes and relocation in unfamiliar places. Assimilation of the relocatees by the host communities in most cases proceeded quite smoothly.

Like other components of population change, fertility rates among the Gwembe-Tonga are high and above replacement level. However, over the years, this has declined principally because of social and economic dislocations. Among the ethnic groups of Zambia, the Gwembe-Tonga are renowned for their institution of polygamy which, though having been affected by adverse economic and social conditions, showed more resilience than the other population factors. Because of these practices among the Gwembe-Tonga, large family sizes are the norm.

Health Status

The period preceding the Dam construction was marked by high prevalence levels of infections which ravaged the population and were accentuated by the absence of modern medicine. With the advent of modern medicine and the massive public health campaigns, most of the diseases were brought under control and people enjoyed a spell of good health standards. Especially because of the economic decline and attendant operational constraints by the health system, diseases previously well managed have resurfaced. Notable among these is malaria. As a result, fatalities have increased too. The mortality of adults has increased more than that for other population groups.

Whereas all the study districts are serviced by health facilities, some of them are under serviced. Siavonga is advantaged. Gwembe district is the most under serviced area and is marked by long distances between facilities and villages. This results in less than optimal utilization of health services. For instance, it was established that most of the people's first point of contact for health care is the health centre to which most of them return for follow up medication. The choice of different types of provides, is therefore, limited. This observation is further supported by the many respondents who reported "not doing anything" for an illness episode as well as those who opted for "self medication".

Among the novel diseases afflicting the Gwembe is the HIV/AIDS which has taken a foothold in much of the Valley. Unfortunately, some economically beneficial activities like tourism from both local and external sources seems to have compounded the scourge. The fishing industry too has facilitated the spread of this disease. Apart from URIs, both malaria and diarrhoea are water-borne diseases whose prevalence coincides with the rainy season. Another water-borne disease which, is, however, not reflected in the utilisation statistics of health centres is Bilharzia which is highly

prevalent in the area. Because of the poor quality of water, cholera outbreaks and associated death have occurred in Lusitu and Siameja areas.

Land Use Systems

This Study established that the land in the affected areas is held under the traditional tenure system. The chief is the custodian of the land and he could locate it to his subjects or any other parties. One of the major consequences of the dam construction is the scarcity of land that has been experienced in the valley and also spilled over to the plateau.

There are a number of farming systems in the Gwembe Valley. *Zilili* is one of the agricultural systems in the area where river bank gardens are cultivated mainly in the dry season on alluvial soil. Along the tributaries, the fields were planted at the end of March after the floods. Along the Zambezi, the *Zilili* gardens are planted first after the receding of the summer rains from the end of May to June. Planting of recession agriculture crops is practiced along the lakeshore from around July progressively following the lake's recession.

Munda, another farming system, is used mainly for growing the staple crop, mainly bulrush millet/sorghum. *Lunda* cultivation follows normal tradition of bulrush millet/sorghum cultivation but with emphasis on drought-resistant and early-maturing varieties because of the sandy nature of soils. Land is usually left for 3-4 years before it is used again. *Matemwa* fields, on the other hand, involve the clearing of the bush and is a relatively new farming system used mainly by people who do not have access to established permanent fields.

Livestock in the valley are highly valued and have been used as a buffer against famine years. The Tonga rarely sell their animals unless there is a very urgent need to do so. The disposal of animals, is done only after reaching a critical number of herds of cattle which, according to Scudder, is estimated at 18. Livestock thrives much better on the lower slopes of the mountains, although large numbers of cattle are kept in the valley floors. The woodland on the chestnut sands accommodates the bulk of rain season grazing while the dambos and mopane areas remain dry season grazing areas, together with a strip of grassland along the margins of the lake after water level recession.

The major single factor for endemic famine in the area is the extremely irregular rainfall. Pests, especially the armored cricket (*bachivwinye*), green grass hoppers (*sabwanda*) and *chipapali* are a menace and can destroy as much as 50% of expected produce.

With the best alluvial soils having been lost to the lake, sorghum, the staple crop is cultivated throughout the valley, and bulrush is common in the drier south while maize predominates in the north. In certain areas, there was little improvement in the system of dry land farming because of increasing population and the absence of agricultural

intensification. Cotton is an important cash crop in the region and there is further potential for high value crops such as paprika on an out-grower basis near big farms like Masstock in Chiawa area.

Although fishing is a major activity in the Valley, most of it is carried out by people from other parts of the country and not the indigenous populations. Because of the lack of a strong and deeply entrenched tradition of fishing among the Tonga and the arrival of other people in the area to take up fishing, conflicts have been reported and if this is not amicably resolved through a process of consultation, resentment of 'external' artisanal fishing communities will continue to be common place.

Apart from farming, the Gwembe Tonga people are also involved in other income generating activities which include the following:

- Hunting, a major off-farm activity whose practice has somewhat declined mainly because of reduced wildlife stocks;
- Gathering and selling of wild fruits such as baobab fruits; and
- Handicrafts and basketry.

An important shift from hoe cultivation to animal traction has been observed in the Valley and this has led to an increase in cultivated land. Cereal and cotton production has also increased as a result of this transition. The expansion in cotton production was facilitated by the collapse of the lake fisheries in the late 1960s. However, the growth of cotton has collapsed again in the recent past because of the recurrent poor rainfall and subsequently reduced yields. Unattractive marketing arrangements have also been contributory.

Recession agriculture and Use of Hydrological and meteorological data

People of the valley have practiced recession agriculture dating back to the last century. Before the dam construction, they had gained knowledge about the timings of the floods on the drawdown and when, therefore, to utilize this land for recession agriculture. However, the construction of the Dam has affected its pattern and some people have had to abandon recession agriculture because of uncertainties about flooding.

With respect to meteorological and hydrological characteristics, Gwembe, Sinazongwe and Siavonga Districts, like other places in Southern Provinces, are generally characterized by poor distribution of rainfall. Despite the poor rainfall experienced in the valley, incidences of flush floods are common as was the case with the Maamba floods of 1997 when crops and property worth millions of kwacha were lost.

The valley is also characterized by very high temperature and consequently equally high rates of evaporation which are higher than rainfall rates throughout the year except for the wet months of December, January and February. Although the Kariba Lake floods annually, the duration and extent of floods vary from year to year. The main

factors influencing the floods include the following:

- The total annual rainfall is the major contributing factor. The level of precipitation in the upper catchment area of the Zambezi river is estimated at 1400mm while the southern part within which the dam falls is estimated at between 700-750mm,
- Regulations of how much water is stored or released to meet the hydropower generation requirements also affects the floods. The peak release from Kariba North and South stations occurs in April, while the lowest release is in December,
- Dam operations can also regulate the water levels through the spillway gates. Due to the persistent droughts, however, these have not been used since 1981.

Integrated Land and Water Transport

Modes of transport

The major means of transport in the surveyed districts were found to be walking, bicycles, animal drawn carts, sledges and, to a very limited extent, motor vehicles. The state of road infrastructure is generally bad with the exception of Siavonga, the most developed town which is linked to the capital city by a tarred road. Because of the limited number of motorised means of transport, communities spend much of their time transporting goods and, therefore, devote less time to productive activities.

Types of Roads

Trunk roads connecting districts are in varied conditions across the area. The seriously rundown road in this category is the famous "bottom-road" which could provide the shortest route through Siavonga, Gwembe and Sinazongwe. The reasons accounting for the neglected state of the bottom-road include the Zambian Government position during the time of the Rhodesian war that developing it would be a waste of resources as it would still be damaged. Secondly, because of the period of neglect and the consequent cumulative decay and attendant compounded costs, the road has not benefited from the National Roads Board Fund.

Township roads are owned and maintained by the District Councils. Unlike Munyumbwe and Sinazongwe, most of the township roads in Siavonga are tarred and in a generally good state of repair. Feeder roads link villages to main roads leading to districts. The maintenance of these roads is the responsibility of the MAFF. These roads are rarely maintained and the situation is compounded by the poor terrain which is characterised by clay soil and multiple river interactions.

It is worth observing that there is no form of public transport along the feeder roads in all the three districts. Open vans are widely used in the area to transport people and goods. And these are mostly run by private individuals and a few are owned by the councils. Sledges and ox-carts are an important means of transporting agricultural produce in the area.

Water transport is commonly used among the fishing villages on the lake and lower Zambezi. Previously, long distance water travel was provided by Lake Kariba Water Transport, a private and public joint venture which subsequently collapsed. Generally, water transport in the area has remained underdeveloped.

Spontaneous Relocation Settlements

In recent times, a new stream of migration has been experienced in the valley. People have moved and are still moving from their earlier resettlements in the valley to new places on the plateau. Households from selected valley villages such as Siameja, Mweemba and Old Chipepo are shifting to new areas on the plateau prominent among which are Chikanta and Njabalombe in Kalomo and Sinadambwe in Mazabuka.

The voluntary relocation of people from densely settled pockets of the valley to Chikanta and other receiving areas will alleviate pressure on the former and therefore reduce chances of further ecological decay. The abundant, less utilized land on the plateau allows for higher levels of production than obtains in the valley. Such positive outcomes notwithstanding, however, the new migrants' life on the plateau is not trouble free.

The scarcity of water for both humans and livestock is a particularly serious problem. Rivers which are the main source of water are inadequate as they usually dry up during the hot season. The paucity of water is further compounded by the lack of dams in the area. In addition to water problems, animals are also ravaged by tse tse flies, which have led to the decimation of many migrants cattle.

The state of social and road infrastructure is another area of concern. The road to Mukandanzovu area in Chikanta is particularly deplorable and in dire need of renovation. Social amenities such as schools and health facilities are also scarce. The scarcity of school places results in children being unable to proceed beyond basic primary school.

Community Participation in Development Activities

The analysis of community participation in this study focussed on activities pertaining to the rehabilitation of schools, clinics staff houses, and road networks. Issues of project effectiveness and sustainability have a lot to do with the involvement of the beneficiary community in the identification of the problems; the conceptualization of solutions to

those problems; as well as their role at the levels of planning, implementation and monitoring, of programmes. Experience from many countries confirms that the management and delivery of services is best handled with the collaboration of decentralized agencies such as local government, the local communities, NGOs and the private sector. In Zambia, the high degree of centralization has seriously compromised the smooth functioning and efficiency of service delivery systems.

After examining some of the projects that a number of agencies undertake in the Gwembe Valley, it is evident that there has been very little community or user participation in the formulation, implementation and evaluation of their projects. In most government-funded social service activities, for example, it has been found that the issue of community participation has not been seriously addressed.

At the lower level, the weak local government planning and management systems have continued to compromise the central government's effort to deconcentrate certain functions to provinces as well as devolving those functions that are better handled at the local authorities level. Similarly, for a long time, the government failed to recognize the potential effectiveness of NGOs, as opposed to the state itself, to reach out to communities in development intervention.

It is now being generally accepted though that for social services delivery, users are more prepared to contribute to the cost of the services if they are integrated into the actual provision of such services. As the World Bank (1989) study concluded: *"User-oriented management is more likely to be responsive to the needs and demands of the intended beneficiaries. This is particularly important in Africa where the availability of [well-trained and] experienced managers for highly centralized agencies is limited and where group effort and community action are entrenched"*. Among the key strengths of community participation in implementing development projects include the following.

- it provides an opportunity for the bottom-up approach of designing and planning development activities;
- it strengthens community ownership of the projects and, therefore, ensures sustainability;
- it promotes active participation and management of the project by community members; and
- it brings to reality the value of empowerment as it restores people's dignity, confidence, respectability and willingness to take care of their own affairs.

Major Recommendations

Road Rehabilitation

The following recommendations are made with respect to road rehabilitation:

- Because of the kind and level of traffic in Gwembe, it is recommended that feeder roads are maintained in their gravel or earth form. Community efforts should be encouraged at this level. Unlike in the case of paths and trunks, maintenance of feeder roads should involve a high degree of technical support. The improvement of the 'Bottom Road' is highly recommended as a first priority;
- The rehabilitation of the old Boma to Munyumbwe road is recommended too.

Irrigation and Water Development

The following projects are recommended in the area of agriculture and water development:

- Pilot project on recession agriculture for the Gwembe Valley;
- Water quality survey of the Gwembe Valley;
- Water Supply improvement;
- Pilot project on low cost water treatment (purification) for small communities;
- Pilot study on rain harvesting.

Health Facilities and Programmes

The following health facilities and public health programs are being recommended for development as specified:

- Siameja Rural Health Center (up-grading and rehabilitation);
- Sulwegondwe Health Center (new construction);
- Chabbobboma Health Post (rehabilitation and supply of water);
- Sinafala Health Post (completion);
- ♦ Public health programmes in HIV/AIDS and Family Planning.

Land Use and Agricultural Development

The following projects are being recommended in the area of Land use and development:

- Agricultural Extension and Land Husbandry;
- Support for Demand-Driven Research;

- Low Cost Irrigation/ Water Management Technologies;
- Resources Development (Micro-Project Support/ Joint Ventures with Villagers).

Spontaneous relocation Areas

The following are being recommended for Chikanta area in Kalomo district.:

- Health center;
- Primary school;
- Road rehabilitation;
- Support for Wild Life Department.

Community Participation

Community participation enhancement projects, which will cut across all the other projects are recommended as follows.

- Greater involvement of beneficiaries;
- Awareness campaigns;
- Project Planning workshops;
- Training of traditional leaders;
- Maintenance skills training workshops.

1.0 INTRODUCTION

This introductory chapter gives background information about the Kariba Dam and a description of the study area. Thereafter, objectives of the study are outlined. The methodology under which data collection methods, sampling, data analysis and limitations of the study are outlined, follows.

1.1 Background

The Kariba dam which was constructed in 1954, was built essentially in order to harness power for the Federal Government. Principal among the users of this power were the mines in Northern Rhodesia. While the project was economically justifiable and has over the years benefited both Zambia and Zimbabwe and all their industries, the social consequences of this project were not seriously considered and the local people have up to now continued facing the negative effects of the dam. At the time of the dam construction, the affected people were promised a number of facilities to mitigate the negative affects of the dam and compensate them for the relocation (Colson, 1971). Although a number of initiatives were made for the funding of a rehabilitation program of the affected areas (Scudder, 1985), the management process had little participation and involvement of the affected communities.

While realizing that so much time has elapsed since the construction, compensatory measures can, nonetheless, still be undertaken to redress these ills. Although the Zambezi River Authority (ZRA), the Zambia Electricity Supply Corporation (ZESCO), and Zimbabwe Electricity Supply Authority (ZESA) were nonexistent at the time of the Dam construction, these utility companies have a responsibility for management of the project related environmental and social impact as principal income earning agencies from the Kariba Project. Thus, realizing their responsibility and in order to mitigate both the socio-economic and environmental consequences of the Kariba Dam construction on the people of the area, ZESCO together with the World Bank, embarked on a study to ascertain the consequences of the dam construction and propose mitigatory measures against these effects.

This study is a synthesis of various sub studies commissioned by ZESCO and the World Bank to take stock of the dam construction effects on the population and their environment. The report starts with a section on the physical characteristics of the survey area, after which a historical account of the project is outlined and then various sections discussing the Demographic and Health Situation; Land Use Systems; Use of Hydrological and Meteorological Data; Integrated Land and Water Transport; Spontaneous Relocation Sites and Community Participation. The report ends with a section that discusses the major findings and recommendations.

1.2 Description of the Study Area

Gwembe Valley is one of the least developed areas in Southern Province. The area has a population of about 125,000 people (MAFF, 1987). This marks an increase from the 86,000 people prior to the creation of Lake Kariba (Scudder, 1962). The total land

area of the Valley is estimated at 1.25 million hectares. The population density in the valley ranges from 1 person /km in traditionally settled areas to 100 persons/km in resettled areas of Lusitu and Kayuni in Siavonga district. As a result of rapid population increase, Lusitu is currently considered the most densely populated area in the valley. Although the valley areas are prone to drought, the majority of the people in the area depend on rain-fed agriculture.

The Gwembe is a rift valley measuring more than 300 kilometres long from the upper end of Lake Kariba down river to the Zambezi escarpment which forms a natural boundary between the valley and the Batoka Plateau. The Zambezi escarpment is steeply dissected with local relief sometimes of up to 300m with slopes of up to 25% rises to about 1 100m altitude. This area is the source of many ephemeral streams flowing into Lake Kariba. The elevation of the valley plains ranges between about 480m, the mean lake level, to 550m and sometimes 650m at the foot of the escarpment. These valley plains are gently rolling at slopes of up to 5% with a width varying between 15-20km mainly but sometimes up to 30km (Dornbusch, 1989). The lake is 320km long covering an area of 5 364km² with an estimated volume of 156km³.

Three climatic seasons can be distinguished: i) the cool dry season (April - May); ii) the hot dry season (August - November); and iii) the warm and wet season (November - April). The dry season temperature average is 26° ranging between 12° in June/July to 46° in October. The warm and wet season is characterized by an unreliable rain season (average 650mm) in Gwembe North and along the lake shore. Gwembe Central and Gwembe South (Sinazeze) and in the escarpment zone of Gwembe North (Changa) precipitation is higher (800 - 1000mm). For the whole valley, rainfall varies between 400 - 1200 mm and can be classified as semi arid. Rainfall distribution and intensity vary considerably and draught periods are quite common. The rain season lasts about 120 days with about 50 rainy days.

The Gwembe valley is divided into three Agro-ecological zones.

- i. Kariba lake shore: This is characterised by relatively low rainfall and frequently experiences droughts. It has fertile clay loam lusosols soils;
- ii. Escarpment Foothills: This area is situated at the foot of the rift valley escarpment with a slightly better rainfall than the lake shore area but without the same access to the lake shore gardens. Soils are shallow gravel regosols on the hills and more fertile Lusosols in the valley. Most cultivation is done on the fertile valley soils;
- iii. Escarpment Hills: The area is at the top of the escarpment and villages are situated along steep sided ridges with fields on both the shoulders of these ridges and in more fertile but narrow valleys.

Three types of soils are found in the valley: soils on the pre-karoo rocks; soils on the karroo rocks; and alluvial soils derived from karroo and pre-karoo material (Scudder,

1962: 14-16). The soils falling on the Karroo rocks are widespread and in the pre 1958 period these soils were the seat of rainfed agriculture. The alluvial soils were commonly found on the Zambezi basin and along its tributaries. These were fertile and were cultivated without laying fallow mainly because their fertility was inexhaustible as they were annually replenished by the floods. In these alluvial soils, the valley people had their dry season gardens where they cultivated a wide range of food and commercial crops. In a drought year, and as long as the Zambezi floods were large enough to cover the dry season garden areas, crops grown in these gardens provided a hedge against famine.

The vegetation consists of many tree species which provide a beautiful green scenery throughout the rainy and early part of the cold seasons. Although there are a number of tree species, most of the valley is predominantly a mopane and baobab environment. Other native trees include the acacias. This vegetation is a source of many edible wild roots, tubers, fruits, and tree seeds. During famine, these edibles provide relief and the Gwembe Tonga survive on them. In addition to being a source of wild foods, the valley forests also provide a variety of medicinal plants which the Gwembe Tonga exploited and have continued to exploit to date.

1.3 Objectives of the Study

The objectives of the study were very wide in coverage and included all the major variants of the dam construction, especially the social and environmental impact. These ranged from a historical account of the valley, review of community participation, use of meteorological and hydrological data, review of agencies active in the valley, land use, transportation status and an assessment of demographic and health issues. Cost estimates for identified projects and an implementation scheme were also included. Specific objectives are listed below:

Task A: Historical Review of the Kariba Dam Development

- i. To describe government ministries and departments, international organizations, and NGOs that have been and are still involved in various aspects of the valley;
- ii. To review and describe the relocation programs offered and delivered to the project affected people; and
- iii. To analyze retrospectively, from a cumulative affects perspective, the marginal opportunity cost of the project, including environmental and socio - economic issues

Task B: Review of Community Participation Activities.

- i. To device methods of developing a participatory consultation program within the various communities of the relocated peoples;

- ii. To design strategies for ensuring that programs developed for rehabilitation are successful; and
- iii. To design a consultation program of stakeholders to determine the needs and ideas presently at issue in the villages and in all stages of program planning and implementation.

Tasks C&D: Use of Meteorological and Hydrological Data in Recession Agriculture

- i. To review the present meteorological and hydrological data management by ZESCO, with cooperation from ZRA, and Department of Water Affairs and Water Development for the Zambezi River Basin catchment related to the project;
- ii. To develop methods for disseminating data on water levels to the village level users;
- iii. To refine methods of formulating the most effective way for providing to users, on a regular basis, the necessary data;
- iv. To describe the outreach officers' functions and responsibilities;
- v. To determine the best location for establishing outreach offices;
- vi. To describe the program deliverables; and
- vii. To develop the program for review by the villages in the participatory workshops outlines in Task B.

Task E: Review of government departments and NGOs.

- i. To determine which institutions, groups and individuals have direct experience in the issues involved;
- ii. To determine which institutions have direct responsibility for administration of lands or services presently used by the project affected people;
- iii. To establish which institutions presently have underutilised capacity which could be mobilised for program implementation; and
- iv. To identify long-term sustainable funding mechanisms.

Task F: Land Use Systems

- i. To review the present land tenure and uses;
- ii. To describe the competitive land use pressure;
- iii. To assess the affected historical/archaeological resources;
- iv. To assess the changes in land use planning and optimization strategies resulting from infrastructure development (e.g. Transport network and electrification);
- v. To make recommendations for sustainable integrated resource plan;
- vi. To review the ecological and social factors in the spontaneous relocation areas;
- vii. To review the land availability and use including agricultural potential;

- viii. To review primary infrastructure available (eg. water, sanitation, schools, health care); and
- ix. To review the socio-economic impact (eg. Host and relocated community).

Tasks G & H: Integrated land and water transport systems.

- i. To suggest modalities for expanded rural electrification of Kariba affected areas;
- ii. Suggest small-scale irrigation projects including the agricultural potential of available land;
- iii. Integration of Kariba Lake transport system with the existing road network;
- iv. Development of small and medium-scale industries (eg. Food processing, local manufacturing;
- v. Development of joint ventures between commercial operators and affected community groups;
- vi. Determination of costs for the above programs and modalities for funding.

Task I: Assessment of demographic and Health issues

- i. Irrigation project development;
- ii. Livestock diseases;
- iii. Health care facilities;
- iv. Malaria, schistosomiasis;
- v. Nutritional status and infant mortality; and
- vi. Review of demographic indicators.

Task J: Proposed Institutional arrangement for Project management

- i. Sustainable revenue generation for programme funding;
- ii. Mechanisms and structure for Board of Trustees;
- iii. Required institutional mechanisms and implementation management committees;
- iv. Fund disbursement mechanisms;
- v. Clear benchmarks for judging success of rehabilitation and development programs at predetermined stages of its implementation and for determining its successful closure.

2.0 Methodology

2.1 Data Collection Methods

Multiple data collection methods were used. These included Review of Records, which continued throughout the project span, Participatory Rapid Appraisal(PRA) methods and household questionnaires. Checklists for interviews with key informants, and institutions were also used to collect data. A variety of methods were used so as to have a wealthy collection of information about the subject under study. A discussion of each method follows below.

Participatory Rapid Appraisal Methods

This mainly entailed the use of Focus Group Discussions, Observations and Informal Interviews with key informants in the communities surveyed. By using these methods, the research team was able to understand the communities better by going beyond mere descriptions and understanding processes behind observed social phenomenon. As an entry point into communities, group discussions were held with village headmen at chiefs' palaces. During these meetings, the headman were appraised about the mission of the research team and were also asked to facilitate the team's subsequent work in their villages by informing their subjects about the project.

Record Review

Record review was done prior to, during and after the commencement of the study. This enabled the Researchers to have advance knowledge of the subjects they were studying and hence helped them design and focus their studies. Drafts of the reports also benefited from literature review as this allowed researchers to put the findings into their wider context. During the data collection process, records of various institutions were also reviewed to generate secondary data that were subsequently used for the reports.

Household Interviews

A structured questionnaire schedule was also prepared and administered to sampled household heads in the survey communities. The primary purpose of these household interviews was to derive quantifiable data that would facilitate understanding the scale of the issues under study. Questions from all the tasks were merged within one questionnaire which was subsequently administered to the sampled households.

2.2 Sampling

The sample was derived on the basis of time and budget considerations. In fact it was discovered during field work that the time planned for was completely inadequate and extensions had to be made to allow for coverage of a reasonable sample. This of course ate into the budget. The Following areas were covered Chipepo, Simamba, old

Mweemba and Sinazongwe to represent the relocatees and Sikoongo and Munyumbwe for the host populations. After selecting the districts two chiefdoms were chosen from which the data collection was conducted.

For the household Survey, heads of households or their spouses were interviewed. The household questionnaire had a separate module for women of reproductive age span. This module contained questions meant to obtain information about their reproductive experiences and also derive nutritional status data.

2.3 Data Analysis

The Household data were analyzed by the use of computer software. The data were firstly entered into the computer using the IQ software. After the data entry had been completed, the data were transferred to SPSS for Windows software where data cleaning was done and preliminary frequency distributions run. Computer printouts with frequency distributions were then circulated to all the team members for use in their individual reports. The researchers were told to request for any other statistics that they needed for their reports. When these requests were received, they were acted upon and results remitted to the researchers.

The analysis of the focus group discussions with key informants and group discussions were done by pairwise ranking and scoring. Focus group discussions and pairwise ranking and scoring were used in the research to determine community needs in the study areas. In addition, content analysis of the FGD records were used to write the reports.

2.4 Limitations of the Study

The major limitation of the study was time which was completely inadequate and resulted in the work being rushed. The delay in remitting funds for the commencement of the study also hampered the project. The research team had to work within a very pressing time frame. The coordination of the project too suffered especially in the initial stages. The composition of the research team which was dominated by staff from busy Government departments greatly complicated the coordination of the study.

3.0 A HISTORICAL REVIEW OF KARIBA DAM DEVELOPMENT

The historical review of the Kariba Dam section looks at the Valley Tonga before the resettlement programme by tracing the origins of the dam's construction from the Rhodesian Federation days. The ecology of the valley before and after the dam's construction is outlined and the number of public and private service delivery agents identified.

3.1 The Valley Tonga Before Resettlement

Two major developments are associated with the construction of Kariba Dam. One was the increase in manufacturing industries in Southern Rhodesia between 1920 and 1945. The other was the development of the Northern Rhodesian Copper Mining Industry. These activities necessitated the development of an effective and reliable source of power, particularly cheap hydro-electric power. Some feasibility studies on the development of the Kariba Gorge as a power generating source were sponsored by the Southern Rhodesian Government, and began in 1945 continuing through to 1950.

The birth of the Federation of Rhodesia and Nyasaland in 1953 brought in new perspectives as to whether Kariba Gorge was the appropriate location. The Northern Rhodesian Government authorities opted for the Kafue Gorge Scheme, objecting to the Kariba Scheme for the fear that the lake would not only inundate the much valuable land along the Zambezi river, particularly the riverine gardens, but also that the scheme would result in the uprooting of thousands of people, mainly those living on the Northern Rhodesian side of the River. The Kafue scheme did not require any movement of people. The authorities further argued that the Kafue scheme would be a great economic asset for the copper mines of Northern Rhodesia than would be the Kariba Gorge. (NAZ, KTE 2/1; SEC5/546 and Reeve (1960).

The arguments against the construction of a power station at Kariba Gorge did not yield the desired goals as the Federal Government insisted on locating the scheme at the Gorge. The economic reason for the latter option was very basic, emphasizing on the creation of the inter-dependence of the two Rhodesias founded on the scheme as a joint venture. It was felt that the economic benefits the two countries would enjoy if the scheme was executed at Kariba Gorge would help reduce the ever mounting hostility Africans from the two countries had for imposing the Federation on them (NAZ, KTE 2/1). Thus, the Kafue Gorge scheme was abandoned and construction work on the Kariba Gorge commenced in 1955. The project was largely funded by the World Bank and was constructed at a total cost of £74,571,429. The construction work was finally completed in 1958 and immediately the Central African Power Corporation (CAPCO) began generating power.

3.2 The Ecology of the Gwembe

While recognising that the Valley had its own stock of problems even before the dam,

it was a paradise in its own right. Central to this was the environment which provided fertile alluvial soils of the Zambezi and deltas and banks of its major tributaries. These soils were cultivated twice annually, thus providing abundant harvests. In famine times, recession agriculture provided a hedge against severe and life threatening starvation.

Also the ecology of the Gwembe supported large cattle, goat and sheep populations. The healthy livestock of the Valley were an envy of many a colonial administrator who constantly remarked that the area was very suitable for livestock rearing mainly because of the absence of serious livestock diseases. This was mainly because of the abundance of water resources of the Zambezi and its tributaries, most of which were perennial. Furthermore, the wide variety of other natural resources associated with the Zambezi basin and its adjacent savanna woodlands provided palatable pastures throughout the year.

3.3 Resettlement Programmes

At the time of resettlement, the authorities promised the affected people a number of things for moving them from their homes. The promises included provision of basic social services such as schools, water, clinics, roads, agricultural training and fisheries training. In addition, people who were moved from their homes received cash payments for leaving behind their physical structures such as houses, kraals and granaries. Also, every member of the affected family was given money while adults were exempted from paying taxes for two years. The resettlement programme which lasted from 1957-1958 affected five traditional chiefs and disrupted building schools, clinics, roads construction, agricultural extension services, tsetse control and eradication and training in fishing activities which included chief Chipeco, Mweemba, Simamba, Sinadambwe and Sinazongwe and involved about 35,000 people. Chief Munyumbwe's area was not affected while Chief Sikoongo was affected as people were moved from their land to give way to Chief Chipeco's people.

Because district administration staff were 'inexperienced, overworked, underfinanced and under equipped' the programme caused a lot of anxiety and uncertainty among the relocatees who did not know why they were to leave their ancestral homes (Scudder 1995,3). The people felt that they were being forced to move without proper explanations. Because of lack of adequate information about the resettlement, the scheme was misconstrued as a ploy to grab land (Chief Chipeco-Regent). Although elsewhere people moved without resistance, in some villages this provoked resistance to the programme. In Chisamu, one of the Chipeco Villages, about 8 to 9 people were killed and 34 injured by the colonial police.

3.4 Consequences of the Dam

The construction of the Kariba dam displaced an estimated 57,000 Gwembe-Tonga people who were resettled away from the lake shore. Of these, 34,000 were resettled on the Zambian side of the river. The relocation exercise had both negative and positive

consequences . Population growth of both humans and livestock overran the natural resources. The relocation exercise immediately resulted in land pressures in host areas, which over the years has led to land degradation and crop failures. Other negative developments that have been noted among the Gwembe Tonga include alcohol abuse, landlessness and lack of infrastructure. Landlessness resulting from the dam's construction is extensively covered in the chapter on land use.

The Kariba dam was not targeted at benefiting the Gwembe-Tonga directly. The dam was meant to support the development of the copper mines and the industrial centres in Northern and Southern Rhodesia respectively. It was conveniently assumed that the Gwembe-Tonga "would adjust while their loss would be offset by use of its power or perhaps find a vacation home upon its lake" (Scudder & Habarad 1995.4). It has been observed that "hydropower projects benefit city dwellers while people at site have their social life utterly disrupted and their health threatened by new diseases and their means of living destroyed" (Thanh & Tam, 1992.12).

Although people were relocated in areas whose carrying capacity was much less than the actual number of people resettled, the government assumed that the problem of critical land shortage would automatically be solved with the formation of the lake and that "the African population would be able to fish on commercial basis and survive and rise above the subsistence level of their previous life" (NAZ SEC 5/454). The Gwembe people were not large scale fishermen. Even if they took up small-scale fishing, they did so along their age old subsistence cultivation. Agricultural farming for them could not be substituted for fishing.

3.5 Overview of Government Institutions, NGO's and International Agencies

Several Government ministries and departments offering services operate in the Gwembe Valley. These include Education, Health, Agriculture, Forestry and Natural Resources Management, Water and Sanitation, Roads and Building Construction, Social Welfare and Security Services. Closer to the Community are local authorities. The performance of both Government Departments and District Councils has been unsatisfactory mainly due to a diversity of bottlenecks ranging from lack of infrastructure, inadequate financial resources to scarce human and operational resources. The introduction of the Public Service Reform Programme seen as long over due is aimed at streamlining the civil service in order to increase efficiency and ensure effective delivery of services to the community.

The Non-Governmental Organizations (NGOs) operating in the affected areas are diverse in nature. The NGOs offer humanitarian aid to the poor and vulnerable people in society. Their work is seen as supplementing Government efforts in the provision of services while some are perceived as advocates or pressure groups, which aim at promoting the interests of particular groups of the community. Table 1 presents a list of NGOs operating in the study areas and their activities. These include: Harvest Help of Zambia, World Vision International, Gossner Service Team, Development Education Programme; CELIM; AFRICARE; Water Aid of Monze; Programme Against Malnutrition

and Churches such as the Roman Catholic and Salvation army.

International Agencies involved in the area include the European Economic Commission (EEC); Finnish International Development Agency (FINIDA), Danish Agency for Development Cooperation (DANIDA); Japanese International Cooperation Agency (JICA); United Nations Children Fund (UNICEF); International Fund For Agriculture Development (IFAD) and Overseas Development Agency (ODA). These mainly provide financial support for construction/rehabilitation of infrastructure such as schools, staff houses, rural health centres and water supply projects but do not have direct contact with the communities. Their funding is provided through NGO's, such as Micro Project Unit and Water and Sanitation Health Education Committees (WASHE).

Table 3.1: Summary of Non-Governmental Organisation (NGOs) and Programmes in the Gwembe - Valley

NGOs	Activities	District
Programme Against Malnutrition (PAM) Programme for Prevention of Malnutrition (PPM)	Coordinating relief food activities; addressing issues of food security; storage; provision of fertilizers and seeds; food for work programmes and seed growing.	Siavonga, Sinazongwe, Gwembe
Harvest Help of Zambia	Offer services to the under privileged in communities. Involved in Integrated Primary Health Care: Child Immunization, Health Education, Family Planning, Ante natal, Post natal Care, Aids Awareness and Education. Income generation and Agriculture.	Siavonga
CELIM	Aids Education through the formation of Anti Aids. Groups in schools and women clubs, Lusitu Development Programme which deals with formation of cooperatives, hammer mill projects and youth projects such as carpentry shops. Promotion of sustainable agricultural Activities, Adult Literacy Programmes, and Environmental Education.	Siavonga
Water AID of Monze	Based in Monze and has some programmes in Siavonga and Sinazongwe. Provision of water, sanitation and financial support to local communities.	Siavonga, Sinazongwe
World Vision International	Helps children in need, construction and rehabilitation of schools, rural health centres and staff houses, Water Supply Programmes, Household Food Security, Women Development Programmes, Income generating activities such as Hammer mill projects and oil pressers, Youth projects in carpentry and skills training	Siavonga, Sinazongwe, Gwembe/Munyumbwe /Kalomo
Development Education Programme (DEP)	Agricultural Sustainability, Agricultural Cooperatives in Irrigation Schemes, Adult Literacy, Aids Education, Food Relief Programmes, Training in drought preparedness and Project proposal writing and management	Siavonga
Roman Catholic Church	Carpentry, relief food distribution, clothing women clubs, tailoring, health care and operation of maize mills, dams.	Siavonga
Salvation Army Church	Distributing relief food, health care and operation of maize mills;	Siavonga, Munyumbwe
Africare	Borehole and dam construction in Sinazongwe and Agriculture activities in Siavonga.	Siavonga, Munyumbwe
Gossner Service Team	Construction of dams, water supply, agricultural projects and youth programmes	Sinazongwe

4.0 THE MAIN FINDINGS

4.1 ASSESSMENT OF THE DEMOGRAPHIC AND HEALTH SITUATION

The following section assesses the demographic and health situation of the Gwembe-Tonga people especially as it relates to the construction of the dam. The section starts with a review of time epochs covering periods prior to, during and after the construction and the associated health and population developments. This is done by outlining three periods during which the Gwembe-Tonga's lifestyles have been variously affected. Current health and population parameters are further discussed in the context of declining living standards. After this, the community's utilization of health services is analyzed and their preference for specific health providers examined. A morbidity and mortality profile and distribution of health facilities in the study areas is laid out.

4.2 Demographic changes over three decades

The social and economic difficulties and opportunities that the Gwembe-Tonga people have been subjected to, have systematically been couched within a coherent framework suggested by Colson and Scudder (Clark, 1995). The schedule consists of epochs marked by major episodes such as the time for the construction of the dam; the years of relatively good advances in living conditions following the country's independence and lastly the years of economic and social stress brought about by a severe economic dislocation, intense warfare in the neighboring countries and major ecological decay.

The first stage covers the period surrounding the construction of the dam when people were forcibly removed from their original homes and relocated in new areas. During this period, the population was struck by a plurality of preventable diseases which were aggravated by lack of access to health services. The inaccessibility to health services was also accentuated by the then colonial government policy which encouraged the ideology of separate development for difference races. A deterioration of health conditions, which was marked by a wide prevalence of preventable diseases among the indigenous population, was observed.

The inequities received active attention following the assumption of political power by the black nationalist movement. This was done through improving access to social services and facilitating the involvement of the indigenous population in the economy by providing employment opportunities. These measures among others, resulted in improved welfare indicators for the indigenous population such as increased life expectancy and reduced morbidity and mortality. Initially these improvements were sustained by a strong economy, which facilitated the wide array of public health programmes that were instituted to redress the inequities.

This, however, took a different turn with the deterioration of the economy that was experienced in the middle 1970s as a result of adverse internal and external forces that resulted in a crippled economy. The era of development was followed by a time of

receding opportunities which can be traced to the middle 1970s and marked by the world wide rise in copper prices. This weakened the state's financial ability to support social services. The steady decline in the state's fiscal position translated in a weakening social support system. Health staff were demotivated, drugs were often in short supply and the health system literally collapsed. The result was a reversal of the gains recorded during the initial years of development.

At the same time that the economic decay was gaining ground, wars of liberation were being waged in neighboring Zimbabwe and other Southern African countries which dislocated people along the border and negatively affected their lifestyles. Health indicators such as general morbidity and mortality rose over the years. Health facilities were disrupted and the resultant adverse conditions impacted negatively on the communities, resulting into among others, dislocation of settlements. For instance people moved from their earlier settlements to areas perceived to be safer havens.

The adverse conditions that the people faced also translated in behavioral change, which for instance saw them becoming less disposed towards polygamous marriages as this became increasingly difficult to sustain. Fertility levels too, took a downward turn as more people opted for smaller and manageable family sizes. The forces that had been set in motion by the above mentioned upheavals continued into the late 1980 and 1990s. If the 1975-1988 was a period of upheaval, the coming era will pose even more challenges. The 1990s have been marked by the coming in of a market led economy where the state has withdrawn from direct involvement in the market place. Selected outcomes of this new policy orientation are already being felt.

4.2.1 Demographic indicators

Marital Status

As with other studies conducted in the country, marriage among the Gwembe-Tonga is almost universal, with about 86% of the respondents either currently or previously married. Among the marital status categories, those that had been married before comprised the largest category followed by those who were widowed. The proportion of men who were widowed was, however, less than that of women who had been widowed. This implies that the rate of remarriage is higher for males than females. Among the Gwembe-Tonga, polygamy is widely practiced and therefore the chance of a man being widowed are much less since they almost always have multiple partners. Women are, however, more likely to be widowed since they have single husbands and hence automatically become widows once their husband dies.

The study results show that polygamy is still a widely practiced tradition, although and as has already been shown, the practice has been negatively affected by hard economic and social conditions that have been experienced over the years. During the boom period of the 1960s and early 1970s, polygamy was highly practiced, but this, however, declined in tandem with the slump in economic and social conditions. The results of the current survey show that although the institution of polygamy is still

widespread, it has not attained the high levels it did in the boom years. The economic and accompanying social decay has held this previously strong pronatalist prop in check.

Table 4.1: Percentage of women with specified marital status for Gwembe, Siavonga and Sinazongwe districts

Marital Status	Siavonga	Sinazongwe	Gwembe
Never married	2	1	4
Married	71	77	82
Separated	2	3	1
Divorced	5	4	3
Widowed	11	7	4
Total number of women	232	283	290

Source: Field Data survey, 1997

Because of such pronatalist practices, marriage is almost universal and women marry at very early ages. For all the districts surveyed, over seventy percent of the women had been married before. The percentage is even higher for Gwembe, where it was estimated at 80 percent of the respondents. The relatively high percentage of ever married women for Gwembe district could be attributed to the retention of values and norms that are of supportive family building because of this area's inaccessibility and hence lack of significant influence from other regions. Other districts like Siavonga on the other hand, have become boiling pots of various people from across the country and the relatively better developed money economy which attaches more value to the individual could have eroded the importance of family unions. Other statistics from Siavonga also confirm the peculiarity of this district. For instance, it recorded the highest percentage of widowhood estimated at 11 percent whereas the percentages for Sinazongwe and Gwembe were 4 and 7 respectively (Table 3.1).

Family size

The Gwembe Tonga are a matrilineal society and they place a high premium on child bearing. Their economy consists mainly of a subsistence agricultural sector which relies on both animal husbandry and farming. They, therefore, have large family sizes which ensures the provision of labor for various household and community activities and particularly for land preparation and rearing of livestock. These attributes have remained largely unchanged and are reflected in the still relatively high average family size.

4.2.2 Utilization of Health Services

In order to determine utilization levels for the various health services in the study population, respondents were asked if anyone had been ill in the past two months, and also what the first and subsequent actions were taken in their effort to get well. For the first action, majority of the respondents said that they went to a Health Center, while the second largest category consisted of those individuals who applied self medication (Table 3.2). Those that sought services of the Community Health Worker were the third largest. The high proportion of respondents that took self medication as the first action, is a disconcerting finding and points to the scarcity of/ or inaccessible of health facilities.

Table 4.2: Percentage of respondents who took first and second actions for an illness episode

First action taken	Siavonga		Sinazongwe		Gwembe	
	1st action	2nd action	1st action	2nd action	1st action	2nd action
Community Health Worker	10	3	1	-	3	-
Health Center	46	22	43	5	46	4
Hospital	5	12	10	3	3	3
Own Medication	11	3	11	2	8	2
Traditional Healer	4	1	3	1	3	3
Did not do anything	-	38	5	60	3	53

Source: Field survey data, 1997

The high practice of self medication has specifically negative ramifications for quality of health care. Administering self medication is particularly problematic in cases of complications where referral may be needed. Cases of patients that could otherwise result in referrals if attended to by a trained health worker might not be so interpreted and a patient may end up not being referred when they ought to have been.

After establishing the first action that was taken for an illness episode, respondents were also asked to indicate the follow up action for the illness episode. After seeking the various sources of care as the first action, majority of the respondents did not take seek any subsequent source of care. Those that sought a second source of care, usually went back to a health center. Hospital based care was the third most widely opted for source of health care. The relatively lower practice of seeking hospital based

care, points to the scarcity/inaccessibility of tertiary level care for the study populations. Because of the scarcity of health facilities and therefore inability for the conventional uptake of health services, there is need to establish health centers in some areas and renovate/ upgrade others so as to maximize on the utilization of health care and intensify referrals.

Table 4.3: Reasons for taking first action in respect of illness episode

Why was the action taken	Siavonga	Sinazongwe	Gwembe
For treatment and advice	44	40	42
Lack of money	5	6	5
Because was very sick	4	4	2
Nearest Health facility	12	7	5
Better treatment	2	3	3
Clinic very far away	-	2	2

Source: Field survey data, 1997

That health facilities were relatively scarce is also borne out by the reasons that were given for taking the first action. The obvious reason given by the respondents was that they needed medication. The second most commonly cited reason for seeking health care from a specified health provider was that it was the nearest, and in most cases this meant the health center. Others said that they had no money with which to go to the hospital and therefore opted for health centers. Not having money means that people can not afford transport fares and therefore, are unable to access hospital services which are almost in all cases located far away from local village settlements.

4.2.3 Family Planning, Knowledge and Use of contraceptives

In respect to knowledge, use of contraceptives and prevalence of unmet need for family planning, women were asked to indicate how many children they had and subsequently probed whether they had planned for all the stated children or not. The majority of the respondents said that they had not planned to have all the children they currently had (Table 3.4). This shows that women are desirous of having smaller families, but apparently lack the means to do so or are constrained by traditional practices which place them in an inferior position to the male folk and deny them the opportunity to take independent decisions. There is obviously an unmet need for family planning and efforts aimed at meeting this need ought to be encouraged.

Women were further probed for explanations about why they had so many children when they actually had not planned for them. Responses provided in table 3.2 reflected the low social status that women occupy and also fatalistic views about their inability to control their reproduction as this was ordained by God. Others mentioned traditional birth control method failure for their high fertility experiences while some blamed their husbands, whom they said disapproved of contraception.

Table 4.4 : Responses on whether couples planned to have their children and reasons

Did you plan to have all the children	Siavonga	Did you plan to have all the children	Gwembe	Sinazongwe
Yes	33	Yes		
No	67	No	24	34
			71	57
Total number of respondents	232	Total number of respondents		
			290	283
Give reasons for your response		Give reason for your response		
Didn't want a lot of children	3			
Man did not want use of contraceptive	-	High cost of living	4	1
No need to stop bearing	-	Need more children	1	11
Manageable number	4	Able to feed them	2	6
Has no knowledge of contraceptive	-	Do not need more	10	6
For spacing	12	Ancestor never planned	4	2
Just as planned	4	Husband refuses the	2	1
God's wish	4	The use of contraceptives	7	14
Was careless	-	God's wish		
Want them to help with work	3	Don't know how to plan	6	11
Could not conceive	1	Spacing	-	4
Wife sickly	1			
Not applicable	66			
Total number of respondents	232		290	283

Source: Field survey data, 1997

The responses regarding knowledge and use of contraceptives are presented in table 3.5. The results showed average knowledge levels estimated at 47, 63 and 56 percent of women in Siavonga, Sinazongwe and Gwembe respectively who knew some form of contraceptives. As would be expected, the use of contraceptives was also found to be lower than knowledge levels. The average percentage of women who were utilizing contraceptives was estimated at 10, 13, and 11 respectively for Siavonga, Sinazongwe and Gwembe.

By and large, the use of contraceptives is very low in the valley. The low utilization level of contraceptives among the Gwembe Tonga is in part a reflection of the already mentioned low status of women. This was evident from group discussion which revealed that women were not free and lacked control over decisions involving their reproductive roles. There are widely held views that women are valued specifically only for fulfilling their reproductive role of bearing and rearing children. The importance of the institution of marriage is further supported by a series of sanctions which include divorce in the case of a woman failing to conceive and bear a child.

Utilization and type of contraceptives varied from district to district . Contraceptive pills were the most widely used followed by abstinence. Although condoms were quite widely known, their use was, however, very low. For the Siavonga community, 13, 27 and 8 percent of the respondents said they knew condoms, pills and loops as methods of contraception. Siavonga residents had relatively better knowledge of contraceptives than the other districts. This could be a reflection of the work of NGOs such as Harvest Help which carries out extensive public awareness campaigns aimed at increasing the uptake of contraceptives. Contraceptive utilization levels for the other districts were lower than those of Siavonga.

Table 4.5: Responses on Knowledge and Use by Type of Contraceptive

District	Awareness		Use	
	Yes	No	Yes	No
Siavonga	47	53	10	38
Sinazongwe	63	30	13	57
Munyumbwe	56	39	11	48

Source: Field survey data, 1997

Table 4.6 : Awareness and Use of contraceptives by type

Awareness and Use	Siavonga	Sinazongwe	Gwembe
Awareness of contraceptives by type			
Condoms	13	1	3
Pills	27	1	35
Loop	8	-	-
Abstinence	3	39	3
Traditional Methods	3	5	2
Use of contraceptives by type			
Condoms	-	1	2
Pills	-	7	4
Loop	-	-	-
Abstinence	-	2	3
Traditional Methods	-	3	2

Source: Field survey data, 1997

4.30 Nutritional Status

In order to derive anthropometric indices for measuring nutritional status of children, weight, height and age variables of children aged less than five years were collected. These measurements of weight, height and age were used to calculate three commonly used indicators of nutritional status namely height - for - age (stunting); weight-for-age (underweight) and weight-for-height (wasting).

Table 4.7:
Nutritional status of children for the districts of Gwembe and Sinazongwe, March April, 1997.

Nutritional Status	Sinazongwe	Gwembe
Height for age		
Stunted	58	64
Normal	<u>42</u>	<u>36</u>
Number of Children	<u>201</u>	<u>273</u>
Weight for Age		
Underweight	27	25
Normal	<u>73</u>	<u>75</u>
Number of Children	<u>140</u>	<u>296</u>
Weight for Height		
Wasted	9	7
Normal	<u>91</u>	<u>93</u>
Number of Children	<u>234</u>	<u>243</u>

The nutritional indicators, expressed in terms of Z scores were generated using the ANTHRO software package. Z scores are standard deviations of actual measurements (height and weight) from the WHO/NCHS reference median (height and weight) values. A cut-off point of -2 SD was used to determine nutritional status. Children with Z scores = <-2 SD were taken to be malnourished. Wasting was found to be slightly higher among children from Sinazongwe (9%) than Gwembe (7%). The low levels of wasting are attributed to the relatively better food availability in the districts at the time of the survey, which was around March to April. Wasting or acute malnutrition reflects prevailing short-term conditions.

Levels of underweight too were not significantly different between the two districts and were estimated at 27 and 25 percent for Sinazongwe and Gwembe respectively. Stunting was rather high for both Sinazongwe and Gwembe and was estimated at 58 and 64 respectively. These levels should be treated with caution as they depart quite significantly from what other surveys have shown. For instance a 1997 FHANIS survey estimated stunting levels for Southern Province to be 45 percent. The above

noted stunting levels are, therefore, on the higher side and could be a reflection of errors in measuring the height of children or at data entry and analysis lapses.

The suspicion surrounding the validity of the level of stunting notwithstanding, adverse factors over the long run have had an impact on food security in the Gwembe Valley. The frequent draughts and consequent food deficits could explain the high level of stunting in the area. This high level of chronic malnutrition (stunting), notwithstanding, however, the low levels of wasting point to the possibility of intervening by way of irrigation systems so that people have ample food supplies throughout the year by reducing the succession of prolonged food deprivation and consequently check stunting levels.

4.4 Morbidity Profile

4.4.1 Malaria and diarrhoeal diseases

Except for water borne diseases which are highly prevalent in the area, the Gwembe Tonga are afflicted with the conventional array of diseases observed in other parts of the country. Malaria is the most prevalent health condition among both children and adults. The incidence of malaria peaks during the rain season when there is a proliferation of mosquitoes as a result of water collections. These months coincide with the rainy season and the resultant water collection points act as fertile grounds for the spread of the disease. From the month of May onwards, the incidence of malaria shows a downward trend, reaching the lowest level in September before resuming the accedence once again.

In addition to malaria, diarrhoeal diseases are also highly prevalent. Although the health facility records do not bring this out as a particularly serious health problem, people who participated in the group discussions identified diarrhoeal as a serious health problem. They specifically refer to the annual outbreaks of dysentery which is locally known as "akared" (translated as "a red thing", in reference to the red color of blood in the stools of an infected person). Discussions about the causes of dysentery showed that the communities did not really know the cause of this disease. Because of the poor quality of water, cholera outbreaks and associated death have occurred in Lusitu and Siameja areas.

Among children, Upper Respiratory Infections (URI) in addition to malaria and diarrhoea are also common diseases. It was the second most common disease after malaria and diarrhoea among the health facilities surveyed. Morbidity statistics from health centers showed that URIs peak during the months of March to June. For all the health facilities, the incidence is less during the dry season which is around October.

4.4.2 STD/HIV/AIDs

Although not prominently represented in the data from health facilities, STDs were said to be common among the study population. STDs were reported to be particularly common in Siavonga district whose tourist attributes and pleasure resorts offer very fertile grounds for the spread of the disease. Associated with the prevalence of STDs is HIV/AIDs which is taking a foothold in the community. Because of the prevalence of STDs and HIV/AIDs in the district, public awareness campaigns have been instituted by agencies such as Harvest Help in Siavonga. Unfortunately there were no other well coordinated anti AIDS activities in the other districts surveyed. But some of these areas are just as vulnerable to the HIV/AIDs pandemic as Siavonga district. The fishing industry for instance draws a lot of people from all parts of the country and the resultant mingling of people could facilitate the spread of the disease. It is, therefore, imperative that anti AIDS activities are stepped up in the districts where there is currently none.

The dam construction, as has been shown in the preceding chapters, brought with it an intensification of fishing activities in the valley and this attracted people from other parts of the countries especially Western and Luapula provinces. In addition, traders from the urban districts also patronize the valley for fish trade. Fishing periods coincide with high demand for condoms and statistics from Harvest Help records attest to this.

Health implications of any proposed project should be taken into account. For instance, while the construction and maintenance of the roads in the province will facilitate the movement of goods and services and therefore improve trade, the same can also be an excellent medium for the transmission of STDs and HIV/AIDs. Public health programmes, therefore, need to be intensified so that people are aware of their vulnerability to infection and are also armed with the means to avoid infections.

4.4.3 Schistosomiasis

Apart from URIs, both malaria and diarrhoea are water-borne diseases whose prevalence coincides with the rainy season. Another water-borne disease which, is, however, not reflected in the utilization statistics of health centers is Bilharzia which according to health staff was said to be highly prevalent in the area. It is not reflected in facility records because people do not report themselves for health care when sick because of the non-availability of drugs for treating the condition.

Likezo Mungomba (1996) undertook research aimed at estimating the prevalence of bilharzia along the Siavonga lake shore of the Kariba Dam. The prevalence of *S. haematobium* was found to be 35% (n=338) with a mean intensity of 13.7+7.2 eggs/10ml urine. Intensity was expressed as geometric mean egg count (GMEC) in the infected individual's urine, unless otherwise specified. Categories of egg intensities used followed WHO guidelines. Of the infected, 75% had light infections (up to 50 eggs/10ml urine) and 24.2% had heavy infections (more than 50 eggs/10ml urine). The prevalence in males was 33.8% (n=198) with mean intensity of 12.6+7.7 eggs/10ml urine and in females, the prevalence was 41.1% (n=129) with a mean intensity of

15.1+6.7 eggs/10ml urine.

The prevalence of *Schistosoma Mansoni* (*S. Mansoni*) was 60.1% (n=323) with a mean intensity of 336.8+4.8 eggs/g stool. Of the infected individuals, 24.7% had light infections (up to 100 eggs/g stool), 75.3% had heavy infections (more than 100 eggs/g stool). The prevalence in males was 64.8% (n=193) with intensity of 334.6+/- 4.8 and prevalence and intensity in females were 56.8% (118) and 340.9+/- 4.7 eggs/g stool, respectively.

Of the total number infected, 69.5% (i.e. 27.5% of total examined) had both *S. heamatobium* and *S. mansoni* infections, and 87.5% with heavy *S. heamatobium* intensity were heavily infected with *S. mansoni*. There was a significant trend for individuals infected with *S. heamatobium* to be infected with *S. mansoni* too.

All age groups above 4 years revealed varying periods of residence in Siavonga and exposure to infection. The prevalence of *S. heamatobium* among the population aged 15-19 who had been resident in Siavonga for 10-14 years was estimated at 150 cumulative percentage, whereas the corresponding figure for those resident for 5-9 years was 100 percent. Prevalence was lowest in groups with over 20 years of residence. Intensity was highest among individuals who had been in the areas for 10-14 years and lowest among those resident for only 4 years or less, by age or migration.

Distribution of infections by type of sanitation showed that there was a higher prevalence of the *S. Mansoni* in people from households that had no toilets. The prevalence among those whose households had pit latrines was also higher than those with communal toilet facilities. The prevalence for households with communal water closets, pit latrines and no toilet at all were 27.9, 38 and 66.7 respectively. There is a correlation between sanitation and the infection rates of *S. Mansoni*. Improvements in sanitation standards would therefore result in reduced prevalence levels of infections.

4.5 Mortality levels and trends

Mortality like fertility rates responded to changing conditions in the valley. This was especially true for the very young and very old. Table 3.7 summarizes child mortality rates in the Gwembe from 1960 to 1992 with estimates for Zambia as a whole, and two closely neighboring nations, Botswana and Zimbabwe. As we might expect, the highest level of mortality rates, just like the highest nuptiality and fertility rates are found in the Gwembe. In studying mortality patterns of the Gwembe, two patterns stand out. On the one hand, child mortality during the first five years of life fell in the Gwembe during the Period of Stress and the Period of Prosperity by roughly one half, from 80 per thousand in 1956 to 40 per thousand in 1968. On the other hand, mortality of the older population aged 50 or over in the Gwembe shifted largely in response to the socio-economic trends of stress and Prosperity and finally during the period of decline from 20 per thousand in 1974 to 40 in 1991.

Table 4.8: Child Mortality in Africa and the Gwembe

Area	Deaths during the first five years of life per thousand births								
	Pre 1960	1960	1965	1970	1975	1980	1985	1987-9	1990-2
Botswana	-	175	160	140	120	90	60	-	-
Zimbabwe	-	160	155	145	140	135	95	-	-
Zambia	-	220	109	180	165	150	-	190	190
Gwembe	274	239	234	170	158	186	189	174	156

Source: S. Clark et al, 1995, "Ten Thousand Tonga: A longitudinal Anthropological Study from Southern Zambia, 1956-1991" in **Population Studies**, 49 (1995), 91-109

The decline in child mortality in the Gwembe during the Period of Stress is surprising but can be attributed, as elsewhere in Sub-Saharan Africa, to the spread of modern medicine. Before relocation, only Mazulu and Sinafala were near a modern health facility, and Chabboboma had a two-nurse missionary clinic located at one and four miles distant respectively. But Musumba and Siameja were 12 miles distant from similarly sparse health facilities. None of the villages was within 50 miles of a hospital. This changed with the relocation in 1958-59. The government established a clinic near the newly relocated villages of Musumba and Mazulu (one and three miles distant respectively) and transferred another clinic to the relocated village of Siameja.

The government undertook a series of public health initiatives which among others resulted in reductions in child mortality rates. Child immunization programmes achieved greater coverage and more women were able to receive ante-natal care and give birth under the supervision of a trained midwife. Other public health activities included massive malaria eradication campaigns that resulted in a drastic fall in the incidence of disease and childhood diseases.

However, these gains in mortality indicators suffered a serious setback following the deterioration of the economy and break down of the social delivery system. This is in tandem with the deterioration experienced for the whole country, whereby mortality has taken an upward turn. While the underlying factors accounting for the observed deterioration of health conditions could generally be tied to the economy, management lapses within the health sector have also contributed to the observed fiasco. To this end, government has reintroduced the policy of fee paying for health services so that some measure of quality can be restored to these otherwise run down facilities.

4.6 Spatial distribution of Health Facilities

Like other health facilities in rural areas, health centers and hospitals in the survey areas are marked by the same operational constraints such as lack of drugs, equipment and qualified staff. The vast and often rough terrain make location of some health centers difficult to access and therefore costly to supervise. In Siavonga district, some health centers which are located along the banks of the dam are so remote and isolated that they are not well supervised by the district officials. Health Centers and Posts such as Munyama, Simunjalala, Chilundundike, which mostly lie along the lake can only be conveniently reached by water transport. Because of the tight financial budget at the disposal of the district office they are, however, not able to access these places as frequently as they would like and consequently, the quality of care provided is below par.

In terms of physical distribution of health facilities, Sinazongwe has the largest number of health facilities (10 Rural Health Centers), followed by Siavonga with two hospitals and seven Rural Health Centers. Gwembe with one hospital and three rural health centers is the most disadvantaged district. Within Gwembe, old Chief Chipeco's area on the banks of the dam is the most disadvantaged area and utilized services of school premises based Health Post for the general population. The hospital, too is very far away from the dam and, therefore, people from distant locations do not really benefit as much.

Chabbobboma Rural Health Center which has the potential of providing health services of reasonable quality, is unfortunately run down and would need a new lease of life by way of renovations. There is a felt need among the community to have the health facilities improved. This need extends to Sinafala village which is a distance away from Chabbobboma. In fact at the Sinafala health post, the community had already organized themselves and built a health Post up to roof level, but was, however, not completed. This project should be taken up and completed so as to meet an already felt-need of the community.

Although Sinazongwe has the largest number of health facilities among the sites visited, its population is also large and widely scattered such that some areas are not well catered for. This is especially the case in relation to higher grade Health Centers which could accord the population a choice of better health care. It would, therefore, be worthwhile to upgrade and renovate Siameja health center so that the population in the area can access it for health conditions that can not be easily managed at lower levels of the health system. In the same vein, it is recommended that a health center be established at Sulwegonde.

Given the population pressures in the Lusitu area, it would have been desirable to recommend for the upgrading of the health centers there, but as will be pointed out later, there are more deserving areas. The pressure on Lusitu health center notwithstanding, the land has experienced devastating ecological decay and efforts aimed at discouraging further settlements there ought to be encouraged. Resources

should be directed at enhancing the capacity of new relocation sites to absorb migrants from areas such as Lusitu by creating social amenities where they are lacking and ensuring organized settlement patterns so that land degradation is averted.

5.0 THE LAND USE SYSTEMS IN THE KARIBA AFFECTED AREAS

This section on land use systems in the Kariba Dam affected area, reviews the land use systems and utilisation rates. This is followed by a description of farming systems which include *Zilili*, *Makuti*, *Munda*, and *Matemwa* are discussed. After this, issues pertaining to livestock other agricultural activities and changes over time are discussed.

A presentation of non agricultural activities and the observed changes in land use follows. The section ends with an assessment of historical and archeological resources in the valley.

5.1 Review of present Land Use Systems and Land Utilization Rates

The present land use systems in the study areas cannot be reviewed without relating them to past practices directly related to the presence of river water and alluvial soils. Along both the Zambezi river below the dam wall, and Lake Kariba, the land supports one to two crops per season. According to information from the people, this was the case even before the Kariba dam was constructed. However, with the dam, the practice has been reduced as a number of people have lost their land. Permanent and semi-permanent villages were sited along the Zambezi river and its main tributaries. Some settlements have been established along main roads where other sources of water have been provided.

Land Tenure

The land in the affected areas is held under traditional tenure system. The chief is the custodian of the land and together with the "*Indunas*" have the authority to allocate it. Once allocated, the land belongs to the holder even when nothing is grown. Access to it is by kinship though others could be allowed temporary cultivation rights for a season or more. However, as indicated in the introductory chapter, landlessness has since been observed especially in Lusitu area where it was reported that young people are now having to pay for a season's cultivation

Conflicting Land Uses

The construction of the Kariba dam proceeded without the consent of the local people who generally opposed plans to build the dam because they feared losing their valuable alluvial gardens and ancestral environments that they had become adapted to. These formerly riverine people are today squeezed between Lake Kariba and the Zambezi escarpment on very poor soils and semi-permanent water sources. There was also a shift in possession of that valuable land resource. The families that possessed the more fertile land along the river were displaced to poorer areas upland that were of little value to them while those who used to dwell on the upland found themselves in possession of increased value land along the lakeshore.

The attraction of people from outside, especially whites, has created 'land grabbing' problems. Some enlightened locals appear to also alienate land into statutory leasehold

tenure. Some land along the lakeshore in Chief Simamba's area has been given to investors and in the process cut off some people and animals from accessing the lake directly. Already some 4 600 hectares has been alienated to about 40 applicants. Similarly, land in Sinazongwe and to a lesser extent in Gwembe is being alienated.

A deliberate reservation of such land in the form of a farm block would greatly reduce the mistrust among relevant bodies and communities. Such a development effort placed at strategic points would be advantageous to local communities in a number of ways, and must therefore not be shunned outrightly. There has also arisen conflict/competition between grazing/crops and expatriates/villagers in the area. Among vegetable growers, the land is fenced off using poles cutting off the cattle from direct access to the water.

Rainfed agriculture with integration of animal traction remain important thrusts for increasing production in the valley. However, a lack of capital and the problem of the tsetse fly are major constraints, and in the case of the latter particularly in the vicinity of wildlife sanctuaries of the Chiawa Game Management Area and the National Parks on the Zimbabwean side of the River. The absence of game parks, a major tourist attraction to Zambia, along the lakeshore has not attracted anticipated development because of the value the locals attach to their scarce land. It becomes crucial, therefore, in this fragile environment to enhance land productivity from existing land use systems; therefore increased animal draught power utilisation in rainfed and recession/irrigated farming systems to attain levels at or above tourism development opportunity cost. The cattle are said to be in superior health than many areas outside the valley within the traditional sector but provided they have access to adequate pastures close to water throughout the year. Some of the lakeshore land offers a good option once management aspects including controlled use of fire have been resolved.

Land Utilization

The level of land utilisation in the districts was assessed to determine the present physical occupation of land by crops and grazing. Land needed for all animals in relation to the total usable land quantified as Occupation Rate (OR). The OR is expressed as $(A+B+C)/D \times 100\%$, where : A= total rainfed crops in ha, B= total annual crops in ha including tree crops, C= area needed for rough grazing in ha, and D= total usable area in ha. Based on the above formula, land utilization classes (LUC) were developed and assessed for the area and presented in table below.

Table 5.1: Land utilization Classes

Land Utilization Class Description	OR(%)	EUR(%)	LUC CODE
Grossly underutilised land	1-100	1-100	IA
Underutilised land	1-100	>100	IB
Moderately utilized land	101-200	1-100	IIA
Moderately well utilized land	101-200	1-100	IIB
Fully utilized land with moderate economic utilization often overgrazed	>200	1-100	IIIA
Economically well utilized land	>200	>100	IIIB

Table 5.2: Sample of Land utilization Classes in the study Areas

Land Utilization Class Description	Siavonga	Gwembe	Sinazongwe
IA Grossly underutilised land	8	-	10
IB underutilised land	2	-	2
IIA moderately utilized land	5	1	1
IIB moderately well utilized land	2	1	-
IIIA Fully utilized land with moderate economic utilization often overgrazed	2	1	20
IIIB Economically well utilized land	3	-	5
Totals	22	3	38

Source: field Survey data, 1997

Thus, based on the results in tables 3.1.1 and 3.1.2, it is clear that most lands in the study areas are fully utilized and often overgrazed, especially in areas where livestock are kept. However, livestock tends to improve economic utilization rates than just exclusive crop production. Although there is evidence of land pressure in some areas, especially Lusitu, there are many pockets of unutilized lands perhaps because of harsh environmental conditions. For example, in Gwembe, Sinafala area, land appears moderately utilized especially near the lakeshore while high pressure on land is common in Sinazongwe due to relatively dense human and livestock population.

5.2 Description of the Farming Systems in the Gwembe valley

The annual cycle of the Zambezi floods was a dominant factor governing life in the valley. In respect to agricultural production, farmers activities revolved around the Zambezi river and its flooding system. The farming system in the valley is characterised by four main cultivation systems:

- *Zilili [Jelele]: river bank gardens cultivated mainly in the dry season on alluvial soil, which totalled 2 200 ha;*
- *Makuti: floodplain gardens, did not receive regular alluvial soil, cultivated both in dry and rainy season;*
- *Munda: rainy season fields on rarely flooded alluvial or karroo sediments, totalled to about 13 000ha; and*
- *Matemwa: bush fields depending entirely on rains, 1 or more kilometres inland from village sites.*

The agriculture products grown under the cropping systems include sorghum, finger millet, bulrush millet, maize, cotton groundnuts, pumpkins, watermelons, sweet potatoes, cowpeas, sunflower and vegetables. The main fields combine sorghum-bulrush millet cultivation, with the cultivated area varying from 1.5 to 2.5ha/household. However, a few farm families using oxen and having more wives exceed this range. Cultivation on better soils continues for 5-8 years with a 1-2 years resting period. Although the main crops are interplanted with crops such as cucumbers, cowpeas, watermelons and gourds, pure sorghum cultivation is observed. Some of the main fields are along the alluvial deposit, middle and lower reaches of tributary rivers. In the middle sections, a broad upper shelf characterised by *Acacia heteracantha*, *Mukoka*, is used for growing sorghum and millet. Early maturing maize is also grown on this land. Sorghum is planted on the lower field on alluvial soil, sometimes with a little millet while maize is planted in its lower margin on Winterthorn, *Acacia albida*, *Munga* soils in November just before the rains.

Zilili Fields

The term *Zilili* other than *Jelele* is common in Sinazongwe district. In Siavonga, the terms used are *Kudindi/Nabukobe* as opposed to *Jelele* with maize and cowpeas as common crops planted from mid-December, and followed by vegetables from May-June. Among the Gobas, this system is called *Matoro*. Others prefer to call it *Nchelela* farming especially in Sinazongwe.

Zilili - the river bank gardens on a small lower shelf which is subject to flooding is characterised by Winterthorn. Maize is planted together with vegetables. In the lower river sections, the lower shelf becomes wider allowing for larger *Zilili* gardens. When this is partially replaced by a wide intermediate shelf of finer and richer Winterthorn silt just above normal flood level, sorghum and maize are grown intercropped with cucumbers, cowpeas, watermelons and gourds.

The field is planted to sorghum and millet if on sandy soils marginal to *Londe* or to pure sorghum if on clay soils marginal to *Mopane*. In either case, a fallow rotation system is employed, and a given piece of land is used for 3-4 years and then rested for 3-7 years while an adjoining area is cultivated. Because of land shortage, rotation has greatly been reduced to 1-2 years especially in heavily settled areas. Inevitably, such stress on the land has failed it resulting into complex erosion consequences and reduced productivity.

Along the Zambezi, the *Zilili* gardens were planted first after the receding of the summer floods from the end of May to June. The river rose again in July and August after which a later planting may be made lower down. In some areas, having large and extremely rich Winterthorn silt, 0.4-1.2 ha was planted to maize, pumpkins, cucumbers, and tobacco under tree shade in May and June. In sites having narrow strips of land, only 0.1 ha fields were possible though they could be extended after the recession of the second flood. Maize was the common crop planted with a mixture of okra and other crops along the upper margin of the garden (Trapnell et al, 1996). Planting of recession agriculture crops is practised along the lakeshore from around July progressively following the lake's recession. Crops grown in the second planting include okra and a new one '*impwa*' [local eggplant] as cash crops for the Lusaka and Siavonga markets. Vegetables such as rape and cabbage are grown for the local market.

Munda Cultivation

Munda is used mainly for growing the staple crop, bulrush millet/sorghum. When soils are exhausted, the land is left to a grass fallow for 1-2 years before planting again. In some areas, abandoned land is evident near homesteads. No fertilizers are used in the fields and in the gardens. The December crop is harvested from May to July. On this land sorghum and bulrush millet are common but interspaced with cowpeas, watermelon, and cucumbers among others. *Munda* now embraces all fields that are cultivated on the upland [*mutala*].

Londe Cultivation

Londe cultivation, which is also regarded as part of the *Munda* fields, follows the normal tradition of bulrush millet/ sorghum cultivation inter cropped with cucumbers, watermelons and cowpeas. The emphasis is on drought-resistant and early-maturing varieties because of the sandy nature of soils. The vegetation is burnt to enhance fertility except where groundnuts are to be planted. Land is cultivated for 3-4 years or 4-5 years on *Mukoka* before resting it for 3-4 years (Trapnell et al, 1996). However, due to land pressure fallow periods have reduced.

In Siavonga, *Londe* cultivation is supporting a stray and low-yielding sorghum variety, 'junction' which is spreading quickly for its early maturity advantage. This variety was salvaged from a fallen truck on the Chirundu-Lusaka road. The adoption rate of this variety is said to be extremely high among farmers there. There also exists in the same district a strategic common granary, certainly at Chilindi and sub-centre, where the local

community grows and keeps strategic seed in case of crop failure. Seed from these reserves would then be sold by the responsible committee to the community. The seed kept here is bulrush millet, sorghum and cowpeas. Since the growing of maize is considered a gamble, this does not form part of the strategic seed.

Matemwa Fields

The development of *Matemwa/Magani* millet fields through clearing of bush is a relatively new phenomenon for people who do not have access to established permanent fields. The *Matemwa* are undoubtedly a less fertile land than the floodplain soils, but allowed new ownership to land to those responsible for the clearing. Cultivated land above the lake flood line before resettlement was estimated to be 11 300ha.

5.3 Livestock and livestock uses

Southern province is one of the major livestock areas in Zambia. The livestock kept in the Gwembe valley include cattle, goats, sheep, pigs and chicken. In Siavonga, the total number of cattle, kept by about 20-30% of the population, is 30 000 while that of goats and sheep is 50 000. Approximately 60% of the people keep small livestock. There are no major cattle pests/diseases on the animals, suggesting high potential in livestock farming. There are several reasons why farmers keep livestock and these include:

- i) they act as a buffer against famine years;
- ii) they provide cash for the most immediate needs, especially small livestock;
- iii) they are kept as a source of draught power;
- iv) they are a symbol of wealth and therefore better standard of living (Kasonde, 1991);
- v) they are also used as food at important ceremonies.

In line with Fielder's concept of critical herd size of proper mix when a household head is prepared to sell cattle for cash, Scudder(1985) estimates 18 animals for Gwembe, which must include 4 trained oxen and 2 untrained bullocks. Annual sales beyond this threshold become common. Depending on what problems people have, animals are sold accordingly.

5.4 Grazing Resources

A GTZ mission report of 1988 is quoted as indicating that 1.18 million hectares is grazing land (Kasonde, 1991). The best potential for livestock lies on the lower slopes of the mountains, though large numbers of cattle are kept in the valley floors. The woodland on the chestnut sands accommodates the bulk of rain season grazing while the dambos and mopane areas remain dry season grazing areas, together with a strip of grassland along the margins of the lake after water level recession. Effective tsetse control, adequate water and food supplies along the lakeshore are cited as some of the reasons for the increase.

Along the lakeshore, swards of *Panicum repens*, *Kapinga*, are common and support livestock especially when there is little to eat elsewhere. The colonisation of the lakeshore margin by extensive swards of *Panicum repens* creates best dry season grazing. However, this is a zone of potential land use conflict with crop farmers.

5.5 Production Trends

To assess the importance and the extent of the crops grown in the study areas, individual farm households were asked to indicate the crops cultivated in their fields. The responses, presented in table 3.2.3 show clearly that the majority of farmers in Siavonga grow sorghum as the main staple food crop, while most farmers in Munyumbwe and Sinazongwe grow maize as a major crop. Together, sorghum, finger millet, maize and seed cotton occupy over 90% of the cultivated area.

Table 5.3: Proportion of farmers growing specified crops.

Crops	Siavonga		Munyumbwe		Sinazongwe	
	No.	%	No.	%	No.	%
Sorghum	181	78.0	2	0.7	5	1.8
Finger millet	23	9.9	10	3.4	3	1.1
maize	17	7.3	242	83.4	222	78.4
Bulrush millet	3	1.3	24	8.3	6	2.1
Cotton	1	0.9	1	0.3	1	0.4
Cassava	-	-	2	0.7	13	4.6
Vegetables	-	-	-	-	1	0.4

Source: field Survey data, 1997

Agriculture production has in the recent past declined because of a combination of both internal policy lapses and adverse factors from outside. Exogenous variables such as the poor rainfall have constrained production in the agricultural sector. Southern province has especially been hit by dry spells. Tables 3.2.3 and 3.2.4 which show trends in land cultivation and crop production illustrate the point. Siavonga district for instance recorded an increase in area under cultivation for all crops except seed cotton during the 1991/1992, and 1992/1993 seasons before registering a decline in the subsequent 1993/1994 season. Although the land cultivated had on average increased, crop production actually declined.

Munyumbwe experienced more shrinkage in area cultivated than did Siavonga. This also had a direct impact on the reduced crop production for all crops except maize and especially finger millet and seed cotton which picked up during the last two seasons. In Sinazongwe district, finger millet and cotton production too picked up during the last seasons.

Table 5.4: Trends in Cultivated Area for Major Crops in Siavonga , Munyumbwe and Sinazongwe

Crops	Siavonga				Munyumbwe				Sinazongwe			
	1990/91	1991/92	1992/93	1993/94	1990/91	1991/92	1992/93	1993/94	1990/91	1991/92	1992/93	1993/94
Maize	1,215.5	1,842.4	3,634.7	1,527.0	3,848.1	1,757.2	703.5	2,109.2	4,690.7	3,566.7	6,247.6	2,756.2
Sorghum	2,007.5	4,017.6	4,094.6	2,082.6	2,739.8	1,696.5	1,335.6	1,127.2	2,806.5	1,784.5	1,980.6	2,941.7
Finger Millet	378.8	673.0	5,848.2	417.1	580.4	394.1	100.8	1,304.4	4,451.7	2,583.7	550.7	3,130.6
Seed Cotton	202.2	682.1	565.0	n.a	1,604.3	1,030.6	571.2	1,706.3	2,458.6	1,440.1	48.0	380.0

Source: CSO. Post Harvest Survey data, 1990/91- 1993/94

Table 5.5: Trends in Production of Major Crops in Siavonga , Munyumbwe and Sinazongwe

Crop	Siavonga				Munyumbwe				Sinazongwe			
	1990/91	1991/92	1992/93	1993/94	1990/91	1991/92	1992/93	1993/94	1990/91	1991/92	1992/93	1993/94
Maize	14,685	2,730	30,471	18,720	35,223	640	6,657	22,073	61,507	2,951	140,307	20,206
Sorghum	9,536	1,761	19,170	11,799	10,944	688	7,833	5,652	13,473	511	6,740	6,284
Finger Millet	16,815	1,445	1,371	21,429	2,437	130	420	6,324	21,161	810	2,726	6,983
Seed Cotton	248,975	96,742	84,125	n.a	1,015,490	83,116	264,600	297,675	2,890,008	93,450	12,000	224,940

Source: CSO. Post Harvest Survey data, 1990/91- 1993/94

Table 5.6: Trends in yields of Major Crops in Siavonga , Munyumbwe and Sinazongwe

Crop	Siavonga				Munyumbwe				Sinazongwe			
	1990/91	1991/92	1992/93	1993/94	1990/91	1991/92	1992/93	1993/94	1990/91	1991/92	1992/93	1993/94
Maize	12	1	8	12	9	n/a	9	10	13	1	22	7
Sorghum	5	n/a	5	6	4	n/a	6	5	5	n/a	3	2
Finger Millet	4	2	4	4	4	n/a	4	5	5	n/a	5	2
Seed Cotton	1231	142	149	n/a	633	81	463	174	1175	65	250	592

Source: CSO. Post Harvest Survey data, 1990/91- 1993/94

The more fertile alluvial soils were lost along the Zambezi and in the lower reaches of its tributaries, and inevitably the annual double cropping opportunity. While the alluvial soils supported either permanent or semi-permanent cultivation, farming at resettlement areas, mostly on Karroo soils, required extended periods of fallowing (Scudder, 1985). However, long term fallowing is not practised due to scarcity of land in many places. Consequently, many such lands were placed under heavy farming pressure leading in some cases to much erosion. A further negative development has been the increasing dependence on less fertile soils (Scudder, 1985).

Cotton is an important cash crop in the region, localised vegetables around new townships, and bananas in the Lusitu-Chirundu areas. Some farmers have expanded their hectares of maize or sorghum for surplus sales. There is further potential for high value crops such as Paprika on an outgrower basis near big farms, such as Masstock in Kafue's Chiawa area or Buchi near Sinazongwe.

5.6 Fishing

Fishing was a respected pastime activity in the area, which has now become an expanded local and commercial enterprise. Though fish was caught throughout the year, its greatest contribution to the diet was from April to June when the river receded (Scudder, 1985). Currently, most of the artisanal fishing in the area along the lakeshore in all the three districts is being done mostly not by the local Gwembe Tonga but rather by other ethnic groups coming from fishing areas notably Bembas from Lake Bangweulu/Luapula river, some Lozis, and Nyanja-speaking people. These outsider groups have been grouped into fishing camps with a view to improve and monitor their fishing operations. Unfortunately, the local Tonga do not seem to have been adequately incorporated into these arrangements to an extent that there is resentment among them especially in observing the new fishing regulations where no one is allowed to fish within 50 metres off the shore and where use of certain net sizes, those below 3.5 inches, have been banned to preserve breeding stock.

Among the locals, there is talk of 'having their canoes broken, people being beaten severely by the paramilitary police the moment they are found in the secluded waters.' They complained that with their small canoes, it was not possible for them to fish in the deep waters, '700 knots away' as someone noted during a focus group discussion. There is need for public education, awareness and consultations as a compromise on these matters. This may allow limited catching perhaps at certain times of the year nearer to the shore for those who cannot reach the deep waters.

Enforcement and monitoring would have to be locally and community-based in order to achieve positive results. If not adequately handled, this aspect may result in resentment of the 'external' artisanal fishing communities, signs of which already seem to exist, and a subsequent physical clash of these two communities. Similarly, the land on which these fishing communities settle will require delicate handling lest someone comes to claim such land as '*katongo ka tata*' (my father's land). If this aspect has not been sorted out already, it deserves primary priority. The people must be consulted to

allow these fishing camps to co-exist. It is not enough just to group a batch of people and allocate them land without full consultation and approval of the local owners of the land.

5.7 Off -Farm Activities

Apart from farming, people in the affected areas are engaged in other off-farm activities that are used as sources of survival. Major off-farm livelihood activities include i) hunting, ii) gathering, iii) handcraft, iv) fishing and v) mining.

Hunting

Hunting for many years was a way of life in the valley. In outlying areas, it was an important source of nutrients especially where no domesticated animals would be kept. There is virtually no game in the area now. Occasionally, boys were seen selling live tortoise or snake skin along the road side in Lusitu area. Wildlife appears to be a past activity. Hunting also used to be part of traditional ritual, for example in the lost fire cleansing ceremony when new fires were lighted. Options for creation of wildlife sanctuaries may be considered, that over time may become income generating ventures.

Gathering

Gathering provided a wide variety of leaves, fruits, and seeds. During times of famine, grasses and other plants with edible seed were cereal substitutes. This practice continues especially where wild sources still exist. In Lusitu area, young boys were seen gathering baobab fruit for sale by the road side. It may be worthwhile to establish more effective bush fire control measures through community participation and involvement.

Handicrafts

Handicrafts provided supplementary income. Basketry was common around Chief Sikoongo's area. Some youth projects were supported in Sinazongwe by the Gossner Mission. These require continued support especially at initial phases of development.

Fishing Development

The level of fishing on the lake has increased among local residents with a major influx of people from the outside. Within eight months of the sealing of the dam in 1958, 407 local residents with 93 boats and 748 gill nets were engaged in fishing. This situation increased to 2000 local fishermen using over 5 000 nets by the end of 1962, and it appears well over 225 boats were used (Scudder, 1985). Being riverine fishermen, with some government assistance, the increased response was expected. Kapenta fishing has become an important enterprise.

Mining

Mining is an important activity for the exploitation of coal in Sinazongwe. Precious and semi-precious minerals such as amethyst, beryl, emeralds, and tourmaline are mined in Sinazongwe and Siavonga districts. There is, however, no organised framework to develop this enterprise.

5.8 Assessment Of Changes In Land Use

Agricultural Land Uses

One positive change has been a shift from hoe cultivation to animal traction. A total of 81 ox ploughs were recorded by 1932. This rose to 1 691 by 1956, thereafter increased to 2 287 by 1963 and allows kinsmen to double areas under cultivation without major labour input increases especially in Mwemba, Munyumbwe and Sinadambwe's areas (Scudder, 1985). Adoption of animal draught power has inevitably meant increased cultivated land and therefore increased production when everything else is available. Less time is spent on the farm and thus allow families to carry out other activities.

Cattle Boom and its Effects

In tsetse free areas, numbers of cattle continue to increase, a clearer case in point being Chiawa, just outside the study area, recently achieving tsetse control. Most farmers in the valley now plant with oxen rather than hoes. Even poorer farmers having no cattle of their own, depend on kinship for ploughing. However, these arrangements sometimes delay planting. Scudder(1985) notes here that in these tsetse free areas, planting with a hoe has now become an exception rather than the rule. He also notes that the shift from hoe cultivation to ox traction throughout most of the valley and the increased production of cotton remain major changes in rainfed farming. In the late 1960s and early 1970s, there was also a surge in the production of early maturing malting sorghum, an important source of income for some. The cotton boom also came and went affected by poor marketing arrangements. More sustainable systems are required in the valley to improved the livelihood of people there.

The building of cattle herds in the 1960s and 1970s following the collapse of the fishing industry led to the transition from hoe cultivation to ox cultivation in most of the valley. This resulted in increased cereal production and subsequently played an important role in expanding the cultivation of cotton as a cash crop in the 1970s. Trained and untrained oxen constituted about 30% of the total herd, increasing from 5 619 in 1959 to 18 055 in 1972 and almost 93 000 by 1984. Scudder(1985) noted that this diversification from the local production system substituted fishing with cattle and cotton sales as major sources of income. Cotton growing, after collapsing, is picking up again especially with the involvement of the Lonrho scheme in the area.

Cotton Development

Cotton cultivation became the main source of income in the valley following the collapse of the lake fishery in the late 1960s. Initially, cotton was part of a proposed four crop rotation with maize, sorghum, and sunhemp introduced in Chief Munyumbwe's area. Kraal manure was applied to the maize with no chemical fertilizers or insecticides. Scudder(1985) reports that farmers adopted a simple maize-cotton rotation without use of kraal manure but applying insecticides using knapsack sprayers 3 to 7 times/season. The number of cotton growers increased from 5 in 1956, to 43 in 1963 and cultivated 20ha. In the 1966/67 season, 350 growers cultivated about 325ha though yields were low, 400-900 kg/ha, increasing after an upset to 613 growers in 1970 cultivating almost 530ha. The average grower planted about 1 ha.

Income from rainfed farming compared favourably with that from fishing in the boom years when farmers combined cotton sales with those of cattle, small livestock, turkish tobacco, vegetables and/or other crops (Scudder,1985). There is little tobacco being grown nowadays. The traditional livestock enterprise has been affected by the liberalised veterinary service leaving these farmers wonder how to effectively look after their animals without government support. Although the people kept complaining that their local agricultural officers did not want to teach them better crop/animal husbandry/health practices but left them to fend for themselves, it is equally true that these people do not like to be told what to grow or what to do (Scudder,1985).

Flood Water Cultivation and Recession Agriculture

The lake's drawdown area is an important farming resource in the Gwembe valley. After a water drawdown model of the lake fluctuations has been made, it will become necessary to study ways of improving land use of the drawdown area especially in Chief Mwemba's area (Scudder, pers.com.). Whereas people have scattered irregular fields in these areas, it would benefit the whole community to rearrange and realloot plots here allowing narrow plots leading onto the lakeshore. Everyone with a field there would stagger their cropping according to the recession/ascension of the lake's water. This development would greatly improve the food security in the area unlike the situation now where some people benefit only at certain times of the recession when others just keep watch awaiting for their turn to come, if any at all. However, such a reallootment programme appears difficult to achieve but worth exploring, based perhaps on realigning family land. At the same time, it may be worthwhile to explore possible plot sizes to enable creation of more plots for more people. It appears 0.1ha is adequate per household.

The old riverine practice was that from March-April when the flood waters began to recede, farmers staggered the planting of a succession of crops with receding levels. Planting continued throughout the cold season, with the lowest planted area on the river banks that was harvested just before the river begun to rise in December. In most flood water gardens, maize, legumes and cucurbits were interplanted, with smaller areas cropped to local Turkish tobacco. A similar practice would be followed in the future as

well.

The new lake levels disrupted recessional cultivation because the annual reservoir regime became irregular. Even when this regime was regularised with annual drawdown beginning in June-July and continuing to December-January, only a few farmers practise recessional cultivation. This may be due to uncertainty and insecurity of the reservoir regime or the colonisation of the better soils by Panicum repens, a grass that has increased land preparation problems but also attracted competing herds of cattle.

Small-Scale Irrigation Potential

While rainfed farming remains a poor alternative, irrigation potential remains somewhat better (Shalwiindi, 1979) when a manageable system has been selected. Some areas have smallholder irrigation potential, that could be developed especially when the lakeshore is electrified. Possible irrigable crops include green maize/baby corn, cotton, bananas, wheat, paprika, siratro for seed, grapefruits and assorted vegetables. On the brown mopane clays, rice is proposed (Shalwiindi, 1979). The heavy investment in irrigation has detracted government and others from developing this enterprise. Large scale schemes opened in the valley such as Plenum and Buchi have either collapsed or changed hands. Even the smallholder schemes appear to have encountered numerous problems, at Buleya Malima, Siatwinda, Chiyabi, among others. Development of this enterprise demands use of cheaper water lifting and delivery devices. The use of a pressurised treadle pump should not be ignored.

5.9 Out grower Schemes

The MASSTOCK Paprika Outgrower Scheme and the Gwembe Cotton Outgrower Development are potential engagement areas for Gwembe farmers and potential good sources of income. It will be crucial to identify some suitable irrigation systems that the farmers can acquire cheaply and maintain easily.

The growing of cotton, an ancient crop in the valley, was intensified in the 1970s and subsequently grown by almost all farmers up to 1988. After this, production declined for two main reasons:

- poor rainfall in recent years resulted in poor yields and therefore low returns;
- unattractive marketing arrangements, sub-contracted to SPCMU by LINTCO.

This development made many people abandon cotton growing. However, it appears that many of them are growing the crop again due to changes both in weather and marketing since the past two seasons. LONRHO now offers its cotton growing packages to its cotton growers through Solubor. The reason could be that there is still some uncertainty regarding the capacity to pay back or it could be that weeding was not

properly done. There is also a slightly different arrangement in the extension service provided - existing government officers are being used but paid a top-up allowance.

Possibilities of sugar cane growing should not be ignored either. There was once a small plantation in the Syanyolo-Syamuyaka [Nzimbi "Sugar canes"] area extending all the way to Sitinkwi. This land is barren today and there is no trace that Sugar canes was ever grown there. Perhaps small sugar extracting implements could be encouraged under some arrangement say with Nakambala Sugar Company.

Other commercial crops grown include bananas and some paprika where 3.5 ha was grown by 12 farmers whose produce was however not bought by Masstock, the initiation of the programmes should be avoided. Tamarind flourishes on the brown alluvial soils, and its fruit could be marketed. The fruit is used for making a soft beer and does not require fermentation.

The cultivation cycle is almost permanent on the narrow zones of fertile deposits adjoining rivers while elsewhere cultivation rotates or shifts. In the latter, periods of continuous cropping vary according to availability of land. Extension messages have begun to yield positive results concerning adoption of a legume/drought-resistant food crop intercropping package. The message encourages building own seed supply by using open pollinated drought resistant varieties where possible. Vetiver grass promotion and use of contour bunds forms part of the conservation practices in the Lusitu area.

5.10 Assessment Of Historical Archaeological Resources

Several historical/archaeological resources exist in the valley. Major among these are the Chirundu Fossil Forest, Ing'ombe Ilede and Kabwe ka Chitondo.

Chirundu Fossil Forest: The site may not be archaeological, but an important resource that appears neglected. There is almost no care other than a sign and monument showing the site. Having seen some of the remnants of the fossil trees elsewhere, one wonders for how many more years those stones would remain at the site.

Ing'ombe Ilede: This was an important traders' site of about 850 A.D. in Pambazana village where the sleeping cow is being threatened by 'piping' erosion immediately around this fallen and deformed living baobab tree. The tree itself perhaps needs trimming to keep the cow shape, but nothing has been done and the shape of the ng'ombe is slowly waning. The wire fence around it is also being vandalised because there is no care taker. Inhabitants traded in ivory, gold, copper, cloth, beads and luxuries obtained from traders travelling up the Zambezi valley. This was also Chief Sikoongo's burial ground and a site of many pottery relics.

Kabwe ka Chitondo or Kabwe Kalema: This coffin-like blackish stone facing the west surrounded by myth of death once touched/moved. Legend has it that when moved

elsewhere it comes back, and anyone who moves it signs for themselves a 'death-warrant.' This stone lying besides a baobab tree in Namukungulu village in Chief Chipeco's area in Lusitu, not too far off from the Roman Catholic Church site. No protection nor sign post exists whatsoever around this rather locally famous stone. It does not appear to be a protected site.

Point of Entry of the Salvation Army Church into Zambia: There is a monument next to Chief Chipeco's palace marking the point of entry of the Salvation Army in 1922, and a church building exists near it.

6.0 RECESSION AGRICULTURE AND USE OF METEOROLOGICAL AND HYDROLOGICAL DATA

This component of the report commences with a review of the extent of recession agricultural activities in the valley. Meteorological and hydrological patterns in the valley and the changes over time are outlined after which factors accounting for the flooding of the dam are categorized. Current meteorological and hydrological data handling practices are also covered.

6.1 Recession Agriculture

The Gwembe Valley is one of the drought prone areas in Zambia with food shortages being a common problem in the area. The people have over the years adopted recession agriculture as one of the hedges used for surviving hunger periods. Before the construction of the dam, people in the area had, through practice learnt the best time for planting in the drawdown area. The floods were predictable and people could plan for their *Zillili* fields with certainty. After the construction of the dam, flooding became unpredictable and farmers have not been able to practice recession agriculture as they used to do before.

In order to assess the extent of recession agriculture and proportion of farmers practicing it in the study areas, respondents were asked whether they grew crops under recession agriculture and used improved agricultural technologies. The responses are provided in Tables 3.3.1 and 3.3.2. From this data it was clear that recession agriculture is still being practiced, although the range of crops grown is very limited. The proportion of farmers growing maize under recession agriculture in Siavonga, Munyumbwe and Sinazongwe districts was 21%, 45 % and 25 % respectively.

Table 6.1: Proportion of Farmers Growing Crops under Recession Agriculture

Crops	Siavonga		Munyumbwe		Sinazongwe	
	No.	%	No.	%	No.	%
Maize	50	21.6	131	45.2	71	25.1
Sorghum	1	0.4	-	-	-	-
Finger millet	-	-	7	1.0	2	0.7
Pumpkins	11	4.7	-	-	-	-
Beans	1	0.4	-	-	-	-
Vegetables	1	0.4	1	0.3	7	2.5
Cassava	11	4.7	-	-	-	-

Source: Field data, 1997

Farmers views on recession agriculture are presented in Table 3.3.2. Farmers were asked for their views on what is needed to improve recession agriculture in the area. The responses as presented in this table show that use of crop varieties supported by improved support to extension services were seen as important for improving crop productivity on farms.

Table 6.2: Number of Respondents stating reasons why Recession Agriculture is good

Reasons why Recession Agriculture is good	Siavonga		Munyumbwe (290)		Sinazongwe	
	Number	%	Number	%	Number	%
Facilitates availability of food throughout the year	24	10.4	41	14.1	32	11.3
Promotes soil fertility	15	6.5	91	31.4	59	20.9
Permits growth of a variety of Crops	-	-	12	4.1	7	2.5
Makes cultivation easy	-	-	4	1.4	-	-
Enables harvests in drought year	-	-	-	-	5	1.8
Allows growth of green vegetables	14	6.0	-	-	-	-

Source: Survey data, 1997

The Ministry of Agriculture, Food and Fisheries (MAFF) runs extension services for recession agriculture through the department of Agriculture. Although agricultural extension officers in the valley are expected to advise farmers on both recession agriculture as well as all other aspects of crop production, the help that the people get in the field on recession agriculture is limited. Close to half of the farmers (43%) in the valley felt that there was no extension service, while 32% felt that it was inadequate. Only 24% of the people thought that extension services were adequate. Since this includes extension service for both rainfed and recession agriculture, it would be expected that the proportion of farmers getting extension services on recession agriculture could be much lower than the 24% that got extension services.

Improving household food security requires increasing farm productivity. Use of improved agricultural technologies such as fertilizers and hybrid seeds is one of the major means through which farmers can increase household food security. Table 3.3.3 presents the results of individual responses on use of improved technology. From this table, it is clear that there is very little use of improved agricultural technologies under recession agriculture. As can be seen from the table, the majority of farmers use local seeds while very few farmers use chemical fertilizers.

Table 6.3: Proportion of Farmers Using Fertilizers and Growing specified Crops under Recession Agriculture

Type of inputs	Siavonga		Munyumbwe		Sinazongwe	
	No	%	No.	%	No.	%
1. Fertilizers						
Nothing	50	21.6	169	58.3	88	31.1
Animal manure	25	10.8	10	3.4	6	2.1
Chemical	-	-	-	-	4	1.4
Not Applicable	157	67.7	111	38.2	185	65.4
2. Type of Seed						
Local	41	17.7	115	39.7	69	24.4
Hybrid	14	6.0	35	12.1	24	8.5
Retained	20	8.6	21	7.2	4	1.4
Not Applicable	157	67.7	119	41.0	184	65.0

Source: Field data, 1997

6.2 Use of Meteorological and Hydrological Data

The three districts in the Valley, Gwembe, Sinazongwe and Siavonga, like other areas in Southern Province, are generally characterized by poor distribution of rainfall which varies from year to year. The area receives the lowest rainfall in relation to other parts of the country. The poor and irregular rains have contributed to high dependence on recession agriculture to supplement rain fed agriculture. In addition to the irregular rainfall in the area, the available rivers are ephemeral (seasonal) and dry up during the rain season and therefore can only be used as a source of water for very short periods.

In order to enhance recession agriculture, it is necessary to not only understand the hydrological and meteorological patterns of the valley but also ensure that such information is transmitted to farmers in time for it to be useful. The meteorological and hydrological factors that are important in recession agriculture include: knowledge and information about when the rains are expected; the timing and rate of flooding; and the expected extent and duration of flooding. These factors help the farmer to plan when to start or stop planting and how much land to cultivate. Currently this information is not available to farmers. As recession agriculture is practised within the drawdown area, it is important for farmers to have access to information regarding the expected drawdown in a timely and regular manner.

Information obtained from the analysis of hydrological data shows that there are significant variations in the drawdown from year to year. In some years, the total drawdown area is substantial while in others, it is negligible. The importance of meteorological and hydrological data in recession agriculture is mainly in forecasting the expected rate and extent of the drawdown. This information would enable farmers to plan their farming activities. It is on the basis of this information that the farmer knows when to start or stop planting and how much land to cultivate.

In spite of the poor rainfall levels in the area, incidents of flush floods are common as was the case of the Maamba Floods of 1997 when crops and property were lost. Such floods are as a result of prolonged rainfall of very high intensities in a relatively small catchment area. The floods usually cause a lot of damage to the river channel, crops planted along river banks and other property. In the process, roads, bridges and small dams are usually washed away. The structures that resist the floods are silted by the high sediment loads resulting from erosion. In relation to the floods from the lake, the floods from the local streams and rivers are of a short duration, which varies from a few hours to less than one week. On the contrary, the floods from the lake have a longer duration of more than one month.

In addition to the irregular rainfalls and regular floods, the area is also marked by high temperatures and evaporation rates. The high temperatures (46°C) in the valley coupled with low rainfall have a significant impact on water availability in the area. In particular, little water is stored in the dams from the rainfall, yet a lot of it evaporates. Consequently many dams and weirs go dry before the onset of the next rain season.

Flooding of Lake Kariba

The flooding of lake Kariba is an annual event although the duration and extent of the flood may vary significantly from year to year. In general, the factors influencing the flooding may broadly be categorised into three main classes: i) Annual rainfall, ii) Operations of the Dam and iii) Annual Water Balance .

Annual rainfall.

The total annual rainfall in the catchment area is the major contributing factor to the flooding of the Zambezi river and the lake Kariba whose catchment has a total area of 663,880 km² extending outside the boundary of Zambia to include parts of Angola, Namibia, Botswana and Zimbabwe. The upper catchment area consisting of the north-western province of Zambia and eastern Angola, receives the highest rainfall while the middle and the lower parts generally receive less rainfall and have a shorter rainy season. Although most of the flow is generated in the upper and northern part of the catchment, the contribution from the local and surrounding catchment is quite significant. The rivers in the lower catchment flow directly into the lake and generate very high spontaneous floods of very short durations.

Operations of the Dam.

Since the impoundment of the river, the amount of water stored or released from the dam is artificially controlled or regulated to meet hydropower generation requirements. Two power stations (Kariba North and Kariba South) are located on either side of the river to generate power for Zambia and Zimbabwe respectively. Data obtained on the operations of the dam reveals that there is a definite pattern in the amount of water released for power generation. The peak release from the two stations occurs in April while the lowest is in December. Occasionally, spillway gates are opened to release excess water from the dam. However, due to persistent low flows into the lake, Kariba dam has not spilt since 1981. The operations of the dam, therefore, affect the timing, extent and duration of the flood both upstream and downstream. Over the years, a general pattern for the flooding both upstream and downstream the lake has been established. Within the lake, the peak of the flood occurs around June while the lowest level occurs around December.

Water Balance

The extent of lake flooding is also dependent on the amount of water remaining in the lake at the beginning of the rain season. The impact of one year's rainfall, be it above or below normal may not significantly change the water level in the lake. However, persistent extreme trends contribute to the reservoir balance. Over the past few years, the lake level has consistently been falling to the extent that contributions from one year's above normal rainfall do not have a significant effect. The other factors that ultimately affect the overall water balance in the lake include evaporation. Evaporation from the lake represents a significant volume of water loss on a daily basis. The mean

annual evaporation from lake Kariba is estimated at 1,560 mm. This implies that on average, evaporation alone contributes as much as 1.56 mm to the lowering of the lake level on an annual basis. The amount of water that evaporates from the lake surface is far in excess of the total rainfall falling directly over the lake.

6.3 Data Collection and Extension Services

The Department of Meteorology is responsible for the operation and maintenance of meteorological stations in the project area. However, some stations are operated by other institutions, private and government organizations on a voluntary basis. All rainfall data are submitted voluntarily, that is the Meteorological Department makes no payment for data received. There are no climate stations (stations that measure other climatic data apart from rainfall) in all the three districts. All the stations (current and closed) only measure rainfall. The hydrological section in the department of Water Affairs is responsible for the operation and maintenance of hydrological stations in the project area. There are also some hydrological stations operated by ZRA and ZESCO. These are mainly located in the upper Zambezi catchment and are used for forecasting inflows into lake Kariba. The general pattern in both meteorological and hydrological stations is that there has been a marked decline in the number of stations and the quality of data collected from the stations.

Several operational problems are associated with the decline of these services at the monitoring stations. These include:

- the retrenchment of observers at stations following the introduction of the public sector reform programme. Most of these observers belong to the category of daily classified employees who are not civil servants;
- poor funding by government resulting in inability to purchase new equipment, stationery and postage stamps;
- dilapidation of equipment due to vandalism and neglect;
- inaccessibility to many stations as a result of poor road infrastructure in the area.

It is important that any recommendations made to re-establish or operate monitoring stations takes cognizance of these factors and takes necessary measures to address them. Unless the situation dictates otherwise, it would be more logical and technically beneficial to recommend re-opening old stations as opposed to establishing new ones. New stations will have to be operated for a considerable number of years before their data can be collated to other stations. For purposes of supporting recession agriculture, the stations should be located within or near existing agriculture camps.

Hydrological and rainfall data handling

Water level is read from a staff gauge three times daily ie at 0600, 1200 and 1800 hrs. The observer (staff gauge reader) is provided with a water level book (WA Form III) in which to record data. Through the use of carbon paper, entries are produced in triplicate with two copies sent to the Regional Hydrological Officer at the end of every month and the third copy is kept in the book at the station (site) as a permanent record. The regional hydrological offices check and carry out preliminary analysis of the water level data received from the gauge readers before forwarding one copy to the headquarters in Lusaka. At headquarters, the data is checked for consistency and accuracy before it is entered into the computer. The data so entered on computer is then analyzed prior to publication and dissemination. There are also some stations that are equipped with automatic water level recorders, radio transmitters or telephones. These are generally referred to as telemetric stations and are used for real time data transmission. Data from telemetric stations is transmitted on a daily basis. All the stations operated by ZRA and ZESCO are equipped with radio transmitters for timely transmission of data.

Daily depth of rainfall is measured in a standard 5-inch gauge at 08:00hrs local Zambian time in mm against the previous data in the rainfall register. This information is posted to the Meteorological Department Headquarters for analysis. Monthly totals are compared with adjacent stations before they are accepted and entered on computer using a software, CLICOM. Through this programme (software) the archiving of rainfall data, and its retrieval has been made simple and quicker.

Attempts have been made to obtain rainfall data more rapidly than is possible using mailed monthly returns. Through initiatives made by the FAO Crop Forecasting and Early warning System Project, some rainfall stations mail 10-day rainfall totals, on a special card, to Lusaka in addition to the regular monthly returns. Some stations also telephone in their 10-day data.

6.4 Water Supply

Being a drought prone area, water supply for both humans and livestock has always been problematic. At the time of relocation, the people were promised provision of improved system of water supply. However, although attempts were made to provide water for the communities, water supply in all the study areas visited was a real problem. Group discussions and individual household interviews held with community members revealed a variety of sources of water for both humans and livestock. As table 3.3.4 shows, the sources of water varies from district to district. In Siavonga district, the majority of those interviewed use piped water as the main source. In Gwembe and Sinazongwe districts, the majority of people get their water from rivers /streams. In areas where piped water and boreholes are used, community members complained of poor and untreated water. In Lusitu, people complained of untreated water while in Sinazongwe, water from wells and boreholes was said to have a bad taste and in some cases water from boreholes turned yellow when boiled. In suggesting water supply programs, therefore, both quality and quantities of water should be considered.

Table 6.4: Sources of Water in the Study Areas

Source of Water	Siavonga		Gwembe		Sinazongwe	
	No.	%	No.	%	No.	%
Piped water	139	59.1	2	0.7	5	1.8
Borehole	43	18.5	27	9.3	80	28.3
River/stream	41	17.7	102	35.2	112	39.6
Well	9	3.9	74	25.5	64	22.6
Hand pump	-	-	72	24.8	22	7.8
Lake	-	-	11	3.8	-	-
N/A	2	0.9	2	0.7	-	-

Source: Survey data, 1997

6.5: Setting up Outreach Offices and Improving the collection and monitoring of rainfall and temperature data.

Outreach offices will be crucial for improving recession agriculture in the area. The use of meteorological and hydrological data can only be properly implemented if extension services are seen to be reaching farmers. Currently, the Gwembe Tonga who still practice recession agriculture have little or no access to information regarding the flooding patterns of the lake and the river for them to adequately plan their farming activities. This is where the establishment of outreach offices for dissemination of hydrological and meteorological data will enhance agriculture production. Outreach Officers are supposed to be at agricultural camps to advise farmers not only on recession agriculture but also on upland and rainfed agriculture. In order to improve the performance of these Outreach Officers, and enhance the monitoring and collection and monitoring of meteorological and hydrological data, the following strategies are recommended.

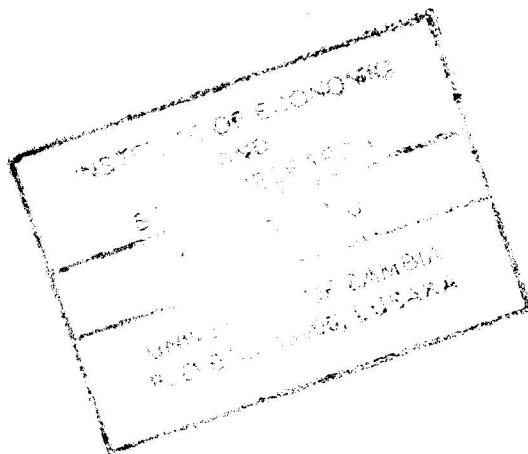
In order to improve the use of meteorological and hydrological data, Outreach Offices should be established at agricultural camps. Officers dealing with the special needs of recession agricultural farmers would should be responsible for collecting rainfall and temperature data;

A simple meteorological station should be maintained at every camp for collection of rainfall and temperature data with the outreach officers trained in the collection of such data for proper forecasting;

Some farmers who practice recession agriculture should be engaged on a voluntary basis to monitor water level fluctuations along the lake shore and the Zambezi river especially upstream the dam. Staff gauges should be placed at identified locations for purposes of this exercise. It is proposed that the gauges should be placed at a distance of about 1 kilometer apart along the length of the lake shore and the river bank;

Organization of field days where farmers can learn and share experiences from one another is recommended. Contact farmers should be used and be given seed and other inputs and followed from land preparation through to harvesting. At every stage, farmers should be invited for the field days so that they learn new and improved techniques in crop production. The field days should also include demonstrations in soil and water conservation techniques;

During the field visit not all agriculture blocks were managed, but with the ongoing restructuring of the MAFF, it is hoped that all agriculture establishments will be staffed in the very near future. The agriculture extension workers at these camps could be used as Outreach Officers. This could solve the problem using different people for agriculture extension work, rain fed and recession agricultural work.



7.0 INTEGRATED LAND AND WATER TRANSPORT SYSTEM

This chapter presents findings on the survey of the transport network in the Valley. Various categories of roads which include Trunk, Transport, Feeder, Other Roads and various forms of transport are discussed. Transportation is then linked to the tourist potential for the area and factors hindering the further development of the latter identified. This is followed by suggestions of the most optimal transport systems, which includes Rural Access and Feeder Roads, Intermediate Means of Transport and Non Transport Interventions. The chapter ends with a brief situation analysis of Public Transport in the study area.

7.1 The Status of the Road Network

Except in a few places such as parts of Siavonga and to some extent Sinazongwe, the whole road network is in a deplorable state. The road network can be split into three classes: trunk (national); transport; and feeder roads. Each of these types of roads is discussed below.

i. Trunk (National) Roads Rehabilitation and Maintenance

These roads link districts with other towns. The roads fall under the Roads Department who also maintain them. These are; the main road from Lusaka, the road to Kariba town in Zimbabwe and part of the famous "Bottom road", connecting all the three districts, and which if maintained would provide the shortest route to Gwembe Central through to Sinazongwe. Currently, travelling to these districts involves going to Monze and Chisekesi to get to Gwembe Central, and Batoka to get to Sinazongwe. The Bottom road has for years been neglected and is almost impassable. As a result of this, most of the activities are therefore between Siavonga and Lusaka as the distance is shorter and the road better. The compounded neglect of the road has its roots in the 1970s, when, at the height of the liberation wars, this part of the valley was heavily mined and government shunned away from maintaining the bottom road. It has reached a stage whereby maintaining it would literary amount to reconstruction.

The road will require major rehabilitation to bring it to a serviceable state. This is one of the roads that would require machine based methods of rehabilitation. Each district can carry out minor maintenance works as the need arises, on the sections falling under their area. Once rehabilitated, it could reduce the travel time taken between the three districts considerably. Alternatively, the Roads Department could continue maintaining the road either themselves or through private contractors using funds from the project.

ii. Transport Roads

Transport roads which are maintained by District Councils get more priority funding over others. Unlike in Munyumbwe and Sinazongwe, most of the urban roads in Siavonga are tarred and in a good state of repair.

iii. Feeder roads

Feeder roads are important links for villages to the main roads leading to district headquarters. Maintenance of these roads is the responsibility of the MAFF. The feeder roads in all the districts are either gravel or earth. Due to lack of funding, these roads are rarely maintained. The problem is further compounded by the poor terrain characterised by clay rocks and many river crossings. The roads require regravelling and repair of culverts and splashes. Much of the past rehabilitation work which focused on severely damaged sections of the roads was done by labour based methods. People living along the roads were employed to provide casual labour with payments ranging between K30,000 to K50,000 per week. The GTZ Project which was contracted to Care International did not last and had to be discontinued due to a number of operational problems relating to accessing materials such as crushed stones which had to be sourced from Lusaka.

Other Roads

The roads leading to the administrative centres in Sinazongwe and Gwembe are gravel. There is need to upgrade these roads to Bitumen. In Gwembe, the Bitumen road needs to be extended from the old Boma to the new council headquarters. The same applies to Sinazongwe district, where the bitumen road passes near the Boma but goes to Maamba Mine. The unit cost of upgrading the two roads is US\$60,000 per kilometre while routine maintenance, after every 5 years would be US\$3,000 per kilometre. These two projects are optional and will depend on the availability of funds and also on priority. They could otherwise be postponed to a later date while maintaining good gravel roads.

7.2 Funding for road maintenance

The administration of the fund for maintaining roads and trunk should be along the same lines as the National Road Fund. The money should not be given directly to the District Councils for fear of misuse as has been the case in the past. A special account should be created specifically for this purpose and the money should be paid directly to the contractors after the road works have been done.

7.3 Forms of Transport

The most predominant mode of transport in the study areas include walking, use of bicycles, animal drawn carts, sledges, water transport and to a very small extent vehicles. Very little public transport exists. In Siavonga, villagers walk an average of 2-3 hours to get to the main Lusaka- Siavonga road where they get buses or private vans to go to town. As in Siavonga, so too in Gwembe and Sinazongwe districts, open vans run by private individuals are used as a means for transport. The Councils also provide transport services with an open van at a fare, between Munyumbwe and Monze. The vans are un-modified and therefore not safe for public transport. Farmers use sledges (ox-drawn) and ox-carts for transporting farm produce. In some cases, ox-carts are used for getting to the main roads. Walking is most common for short social visits while ox-carts, vans and minibuses are the predominant means of travel for going to town.

Because of the highly prevalent poverty and therefore lack of or limited financial resources, people cannot possess ox-carts and have to hire from those who have. A local villager in Lusitu area who manufactures ox-carts from scrap metal and wood revealed that the total cost of producing a simple cart is much lower than commercial prices. Most of the raw materials like metal scrap, used tyres and wood screws are obtained from Lusaka. The workshop, which uses local timber and an electric welding machine, produces ox carts with a carrying capacity of 10 - 90kg bags of maize and can be pulled by two, four or six cattle. The carts are made on order and can either be bought for cash or easily bartered with cattle. Although sledges are a very slow means of transport and have limited capacity, cattle owners who cannot afford ox-carts make use of them. In addition, usage of sledges puts too much pressure on draft animals thereby reducing speed.

The use of vehicles is more prominent in the urban areas than in villages. Siavonga District, the most developed among the three districts has more vehicles, followed by Sinazongwe then Gwembe Central. Siavonga District which lies to the northern most part of Lake Kariba, is linked to the capital by a tarred road. Although all the resettlement villages have roads linking them to the main highway, these roads are not well maintained. Although gravel, these roads could if well maintained, provide good access to the district centres. The major economic activities such as tourism, fishing, and farming depend on these poorly maintained roads. Upgrading and maintaining these roads would facilitate the development of commerce and other productive activities.

7.4 Water and Cross boarder Transport

Although the water transport system in the area is underdeveloped, it is commonly used by the fishing villages on the lake and in the lower Zambezi region. Dugout canoes are used to transport people and goods. While Siavonga District Council provides a boat service for both goods and people to the Islands on the lake, there is no long distance water transport among the three Gwembé Valley districts since Lake Kariba Water Transport, a part government owned company collapsed some years ago. The available private charter services are unaffordable to the villagers. The services provided by the council boat are not efficient due to operational problems resulting in frequent breakdowns and shortages of fuel.

In some villages like Sinafala, water transport provides the easiest and quickest route to Chabbobboma Health Centre. The alternative is walking or using ox-carts, which takes hours. Instead of encouraging the ownership of canoes and hence facilitate diversity in transportation, the Department of Fisheries is thwarting this as indicated in the section on Land Use. During the off fishing season, villagers have had their canoes confiscated by the Fishing Department on suspicion of illegal fishing. This has discouraged villagers from using, let alone owning canoes. People have as a result resorted to walking long distances.

In Sinazongwe, apart from one privately owned manna vessel which occasionally goes to Zimbabwe, there is no proper direct transport system to service the area. As in the case of Gwembe Central, the only route is by road through Monze and Siavonga. This is quite expensive for people who wish to go across the boarder for various purposes. There is no regular scheduled water transport system in the districts. In Sinazongwe two businessmen

sometimes provide services to either Zimbabwe or Chipepo and Siavonga depending on demand. The vessels are also available for hire to interested individuals or organisations. Harvest Help sometimes also provides a service to the fishing camps and Chipepo area in Gwembe District. There are some individual fishermen in the fishing camps who own boats/canoes for transporting fish from the camps to the lake shore.

As earlier mentioned, water transport could provide an economical and quicker way of travel between the three Gwembe Valley Districts. Although it may appear that there is no demand for water transport, this is because of the unreliability and uncertainty surrounding the system. If a regular service were provided, it would create its own demand because the routes would be shorter and the service cheaper than using either the Bottom Road or the Monze route.

7.5 Tourism Potential

The potential for tourism still needs to be taped further in all the three districts. As indicated in section on land use, a number of historical sites are available. Other sources of tourism include boating and fishing which are still underdeveloped. In Sinazongwe District, the lake itself is an attraction which provides a beautiful scenery. In addition, activities such as fishing competitions, crocodile farming and boating could be set up in the area. In fact, Sinazongwe is at an advantage since powerline from the coal mines has been extended there. The area has good roads, which if properly maintained, could provide good access to tourist attractions and sites. Among the major factors hindering expansion of the tourism sector include: lack of adequate accommodation, poor transport facilities and general lack of investment in tourist resorts. These issues ought to be addressed if the tourism potential is to be developed.

Sinazongwe district seems to have a higher vehicle ownership than Gwembe. The most common vehicles owned by villagers were sledges, ox-carts and bicycles. The Provincial Roads Engineer (PRE) receives funding for road maintenance from government grants and the National Roads Board (Road Fund).

The Roads Department is beset by operational constraints such as lack of graders and vehicles which are supplied by the Provincial Roads Engineer in Livingstone. The Department only has hand tools which include wheel barrows and shovels which are used only for minor road repairs. The department is poorly staffed too and only has one supervisor, three general workers, two drivers and two watchmen. In an ideal situation, there are supposed to be 15 more casual workers.

The analysis of the status of rural roads and forms of transport in the Gwembe valley yields useful information that points to a number of important intervention areas for improving the transport system in the area. As is observed, the current transport system and infrastructure in the areas does not provide incentives not only for economic development but also for efficient delivery of social services. Agricultural production too depends among other factors on a good transport system. Studies have shown that the rural population in Africa depends very much on a net work of paths, trails of often unmade, unimproved and unmaintained nature. As a result, rural travel and transport is characterised by unreliable, slow, low capacity forms of access for people and their goods. This description fits the situation obtaining in the valley. To

ensure that travel time savings are directed to more productive purposes such as agriculture, the major challenge for rural travel and transport interventions is to reduce the time and effort currently unproductively spent on obtaining access to basic social and household needs. Improving the rural road net work and other forms of transport in the areas is critical for raising the standard in these communities.

7.6 Strategies for Achieving the Most Optimal Transport System

In trying to find solutions to the transport problems in the Gwembe Valley, it is important to understand the daily needs of the local subsistent farmers and fishermen. There is also need to bring essential services such as clinics, schools, water points, grinding mills and others close to rural households. Emphasis should, therefore, be placed on accessibility to basic needs planning so as to provide easier, cheaper, faster, more efficient, effective and reliable means of travel and transport. The strategies to be adopted for planning for rural travel and transport in the Gwembe area should be based on the following levels: (i) Rural Access Infrastructure (RAI) ; (ii) Intermediate Means of Transport (IMT); (iii) Rural Transport Services; and, (iv) Non-Transport Interventions (NTI)

The solution should concentrate on intra and inter village level travel with a small provision for travel to town. Heavy investment in major roads may only lead to outsiders benefiting at the expense of rural development in the Gwembe area. Major economic activities which require transport and travel to other towns are dominated by people from Lusaka and other towns and not by the locals. This means that if intra/inter village travel is overlooked, then the project will be meaningless to the people. Investment in major roads should be limited to a level where such services as medical, educational, farm inputs can be transported in the Gwembe at an optimum cost for the benefit of the people.

Rural Access Infrastructure (RAI)

The Rural Access Infrastructure (RAI) in the Gwembe consists of paths, trunks and feeder roads. In this study, a path is taken to be a narrow cleared way for pedestrians and in some cases bicycles and motorcycles. Although the paths and trunks are passable during most of the year, they became very difficult to use in the wet season when rivers and stream crossings become impassable due to high water levels. This cuts off villages from such basic services as schools, health facilities and sometimes even points of firewood collection. Upgrading of paths and trunks in the area is therefore necessary to facilitate all year round travel and the use of non motorised intermediate modes of transport.

Maintenance and upgrading of this kind of infrastructure can best be administered at the village level. The local people together with local leaders should be allowed to identify which paths and trunks need to be improved according to priority. Most of the inputs in these projects will be labour which is readily available during the non agricultural season. This should be complemented with simple tools such as shovels, wheelbarrows and cement particularly when it comes to river and stream crossings. Labour should be organised on a voluntary basis and this will require community awareness education to enlighten the villagers on the need to participate in community projects. Such projects will require minimal technical supervision from

outside. This will basically be an internal matter at village level which could be administered either through the chiefs or headmen.

Feeder Roads

Although attempts are made in the three districts to ensure that the feeder roads are passable all year round, these remain seasonal roads which are often impassable during the wet season. Because of the kind and level of traffic in the Gwembe area, it is prudent to maintain the feeder roads in their gravel or earth form. Surfacing (putting tarmac) such roads would not be economically justifiable and it is only reasonable that the available resources should be used on economically viable projects that would benefit the target groups.

Research has shown that provision of basic single blade roads can be done at 8% of cost per kilometre of conventional feeder roads (Dawson, 1993). In addition, low cost measures such as spot improvement in critical sections like river and stream crossings and side drainage should be given priority. This will reduce the need to work on the entire road even when some sections are in good condition. Low cost road construction and maintenance methods are therefore recommended. This should provide road access to meet specific transport demands such as access to markets for agricultural inputs and produce.

The above objectives should be achieved through self help programmes by the community and work should therefore be limited to feeder roads which provide direct access to the participating community. This will ensure that costs are minimised because only priority feeder roads which the community feels are essential to their daily transport and travel needs will be rehabilitated.

Unlike in the case of paths and trunks, maintenance of feeder roads will require a high degree of technical support and supervision to ensure good standards. This technical support is already available in the study area. It is being utilized in road maintenance by Care International through the GTZ and ASIP project. Staff from either the District Council's Director of Works, the Roads Department or the private sector could be seconded for maintenance of feeder roads. What is required is appropriate training of workers in these institutions to ensure that they have knowledge in labour based road maintenance procedures. Labour based road maintenance methods should be used to the maximum extent feasible. This is ideal for rural road maintenance because of the benefits that accrue to the local community. Apart from ensuring that roads remain passable for most part of the year, this method also provides income for the community through provision of employment.

The best way to maintain feeder roads in the study area is to involve small scale contractors. Private sector involvement in the road maintenance will ensure accountability in the use of resources. The Roads Training School which is under the Ministry of Works and Supply in Lusaka, is currently offering courses in construction and maintenance of rural roads using labour based methods. The programme is being sponsored by the ILO. Local small scale contractors could be identified and sponsored for this course to enable them assist in the road maintenance programme. These should be complemented with appropriate equipment where labour alone would not do. Simple equipment such as tractors, trailers, ox-carts, wheel barrows should be used where necessary. This simple equipment is readily available in the country and

the technology used in their construction can easily be passed on to the community for easy of maintenance and repair.

However, considering the poor state of most of the roads particularly in the Gwembe district, major rehabilitation will be required to improve the road surfaces, construct bridges, culverts, splashers and side drainage in the first year of the project. This will require equipment based methods where heavy machinery such as graders and bulldozers will be used. These are available for hire from either the Roads Department or private companies.

After this major rehabilitation, what will follow is labour based periodical maintenance as mentioned above. This should be done twice or three times a year just before and after the wet season. This will keep the roads in a good serviceable condition for a good number of months in a year. Labour based methods will be augmented, every five (5) years by routine maintenance which will again involve reconstruction of bridges, culverts and side drainage where necessary to ensure that the roads are accessible. This type of maintenance should only cost within the range of US\$650 - 750 per kilometre depending on the state of the road.

If the above cycle of road maintenance is followed, most of the roads will remain in good condition most of the time, at minimum cost. It is worth noting that no new roads should be constructed in the study area. The existing infrastructure is adequate. What is required is maintenance of the same to keep them in a good condition for most of the year. All efforts and resources should therefore be focused on this cause. Construction of new roads will only create more maintenance problems as evident from the state of the existing network.

Intermediate Means of Transport (IMT)

These are the low cost vehicles and carrying devices of various kinds which have proved appropriate for local level transport tasks. They include such vehicles as: Wheel barrows, handcarts and bicycles, animal drawn carts, sledges and boats propelled by oars, sails or small motors.

Since most of the travel in the study are inter/intra village, it is strongly recommended that the use of IMTs be encouraged because they are cheap, low capacity and are more likely to be available, affordable and usable. IMTs can play a significant role in enhancing agricultural productivity and have the following advantages over the conventional motor vehicles for local-level rural transport tasks:

- (i) they are considerably cheaper i.e. they require low capital investment;
- (ii) they suitable for small scale manufactures;
- (iii) they require low level of maintenance and are easier to maintain since they rely on locally available materials and skills;
- (iv) they do not require as much infrastructure (space) as do trucks and pick-ups. They only need a reasonably flat surface about two metres wide;
- (v) they are more suited to the small and medium sized loads which are often transported at local levels.

Given the low ownership of IMTs in the Gwembe area, it is imperative that deliberate measures

are taken to improve the situation. There are many ways in which this can be achieved as indicated below.

Ox -cart and Wheel Barrows

The first step in increasing the number of IMTs in the area is through production of ox-carts at local levels using local inputs such as labour, wood, used tyres and metal parts. As indicated in the earlier sections of this chapter, this is possible because a number of people in the area already manufacture ox-carts. Because the people in the area traditionally keep animals (oxen) it would be prudent to concentrate more on ox-carts and less on bicycle ownership. Consideration should also be given to wheelbarrows and handcarts as these can be manufactured locally using the same facilities as those for making ox-carts. The technology for making boats also exists in the area. What is needed is just support, in terms of finance, to increase production to levels where more households living along the lake shore will own boats.

The sourcing of raw materials for manufacturing ox-carts, wooden wheel barrows and boats is easy in the area. What should be done is to ensure that more people are involved in the manufacture of IMTs through establishment of more workshops in the villages. A credit scheme to be administered by a local NGO in the area, should among other things provide credit to small community groups for either manufacturing or purchasing IMTs. These IMTs should be available both for hire and or purchase, depending on the need and ability of households.

Small enterprises should be set up to manufacture ox-carts and wheelbarrows using the available raw materials and equipment. This is best suited to the uneven demand which exists for IMTs as it relates mainly to the agricultural cycle. Localisation of manufacturing will also mean that maintenance and repair capability is locally available while at the same time ensuring that distribution costs are kept at a minimum. A more integrated approach to the problem is to use IMTs as part of payment in-kind for productive work such as provision of labour for maintenance of trunks, paths and roads. This will simultaneously tackle the problem of rural transport and travel. The funding for the manufacture of the IMTs should be on credit basis. Payment for purchase of an IMT should either be cash or through agricultural produce.

The average cost of setting up a workshop with a capacity to manufacture about 50 ox-carts per year is US\$8000. If as a pilot project two workshops were set up in each of the three districts, the total cost requirement would be US\$48,000. The working capital required to begin operations is US\$1,100 per workshop bringing the total for the three districts to US\$6,600.

If desired, the pilot project could be set up in one district with only one workshop and later the project could be spread to other areas in the district and subsequently to the other two districts. The advantage with workshops is that they are simple woodwork/metal workshops which can be used to manufacture various other items like boats, wooden wheel barrows and domestic furniture. This will ensure that during the low demand periods, the available capacity is used for manufacturing these other products. The returns on the pilot workshops could then be used to set up more workshops in other areas thereby making the project self sustaining in the long

run.

Sledges

The use of sledges for heavy duty tasks should be discouraged as much as possible because they are uneconomical in terms of capacity and speed. Efforts should be directed towards empowering people to own more advanced IMTs like ox-carts and wheel barrows. If the measures suggested above are adopted, there should be a decline in the use of sledges in the Gwembe area.

Training

Training programmes should be arranged for people to do carpentry/metalwork to enable them get involved in the manufacture of IMTs. Trades training schools or local carpenters could be used for this purpose. Short courses could be arranged at village level with experienced local carpenters to train people in these skills. Alternatively, potential trainers could be identified in the villages to do courses in carpentry or specifically in IMTs production in other countries in the region. Institutions specialised in such courses are available. In Tanzania, for example, there is the Centre for Agricultural Mechanisation and Rural Technology (CAMARTEC). The institution deals with designs of appropriate technology for rural areas and could be useful in training trainers for the Gwembe Project. CAMARTEC trains artisans from rural areas in the art of building wheelbarrows, ox-carts, and hand carts.

Non Transport Interventions (NTI)

Non Transport Interventions (NTIs) will complement transport ones in trying to address the problem of travel and transport in the three districts. As all the measures mentioned in the earlier sections of this chapter are being undertaken, it is imperative to improve accessibility by reducing the need for travel by the people. Non-transport interventions to improve accessibility in the study area fall into two broad categories (i) the location of facilities and (ii) storage facilities.

The key determinants of the pattern of travel for a particular purpose are the distance to the facility involved and the means of transport used. These determine the time and effort involved per trip, and also influence, to a greater extent, the frequency of trips. The siting of facilities (such as water and firewood sources, agricultural input supply centres and crop marketing facilities, grinding mills, clinics and schools) in relation to the communities should be reduced so that as this will improve mobility of the beneficiaries. Thus, locating such facilities closer to the communities will help reduce the transport burden.

Construction of appropriate storage facilities around villages will help limit demand for transporting agricultural crops and ensure food security especially in areas of poor accessibility. With the level of production in Gwembe area, storage facilities at village level may be sufficient to reduce the need to travel for this purpose.

Two forms of water transport in the area are canoes and small motor boats. This type of

transport is mainly used for travel between villages along the lake shore. This mode of travel is not very common in the area and if a proper road transport system is developed, the demand for water transport will be reduced further. As mentioned in the first part of this chapter, most of the travel needs of the local community are within the village or to nearby villages. Private boats and canoes should continue to be used. A public transport system may experience low and often fluctuating demand. It therefore requires efficient management. People wishing to own boats should have access to the loan scheme which could be established to provide loans for acquiring IMTs.

There is very low demand for cross border travel in the area. This is attributed to the many years that have passed since the construction of the Kariba Dam and also as a result of lack of a reliable transport system. With the changes in the social-cultural activities, the need for cross border travel has declined over the years. While regular cross border transport system would benefit the local community, tourists and traders from as far as Lusaka and other town would also benefit. Thus, opening a boarder post for Gwembe and Sinazongwe districts would benefit not only tourists and traders but also the local population who may have lost contact with their relations in Zimbabwe.

7.7 Public Transport Services

As mentioned earlier, the public transport situation in Siavonga is not that bad due to the district's proximity to Lusaka. Most of the long distance travel needs are therefore adequately taken care of. What is required is to enable people travel from their villages to the nearest point where they can catch a bus, van or truck to town. This travel to and from the villages will be done using IMTs which are more suited for this kind of travel. It would be very uneconomical to introduce bus services along the shorter feeder roads because of the low and highly seasonal traffic.

Once the bottom road has been rehabilitated, a bus service could commence to operate between the three districts. There will, therefore, be no need to go through Monze to get to either Siavonga or Sinazongwe from Gwembe. Initially, two buses could be deployed on the bottom road while assessing the demand between Siavonga and Sinazongwe. This service will not only serve inter district travel needs but it will also ensure mobility between villages along the road. One of the buses should be stationed in Siavonga while the other one should be in Sinazongwe.

In the case of Gwembe and Sinazongwe, there is need to improve the public transport systems in the areas to bring them to more efficient levels. The two districts are located far away from the main road between Lusaka and Livingstone and therefore require some form of reliable and cost effective transport system to move people and their goods to and from town.

Given that the levels of motor vehicle ownership in the study areas are generally low, the mobility of the people and their goods will increase as a result of road improvements only through the efficient operation of transport services. It is therefore essential that at the local level, affordable transport services are available for people to reach markets for their crops,

sources of farm inputs, health and educational facilities. In order to achieve this, there is need to promote the use of appropriate vehicles such as the country bus (UBZ Country bus project, 1989/90) which was introduced in other areas of Zambia. The bus was assembled locally and had two compartments, one for passengers and the other for goods. The advantage with the country bus is that it is built on a strong chassis which is meant to carry goods and would be most ideal for the kind of terrain in the area. Additionally, the buses could be converted to carry either goods alone or passengers only. In developing the country bus, only the chassis and the driver's cabin need to be imported. The rest of the modification can be done locally by motor assemblers as long as the specifications and requirements are given to them.

Once the buses have been acquired, they could be given on loan to local businessmen who are already in this business although most of them use unsuitable vehicles. If the councils were efficient, they would have been more ideal to run the buses, but given their poor financial standing, it would be too much for them venture into such activities. A private sector driven transport system is therefore recommended. This could be either local business or community groups. This project should proceed in phases, firstly six buses for each of the two districts (Sinazongwe and Gwembe) could be acquired on a pilot basis. Depending on the success of the pilot project and the level of passenger and goods traffic, this could be expanded. Siavonga will require two (2) buses to operate along the Bottom Road.

The estimated average cost of acquiring a country bus (Preferably Toyota DCM due to availability of spares in the country) is US\$90,000. Initially, Gwembe and Sinazongwe will require six (6) buses each. The total cost of acquiring Twelve buses is therefore US\$1,080,000. Siavonga District will have two (2) buses to service the Bottom Road. These will cost US\$180,000 bringing the total to US\$1,260,000. The loan scheme for this purpose could be administered through Non-Governmental Organisations in the area. The recoveries from the loans will create a revolving fund for the purpose of acquiring more buses and spares which will be sold to the operators.

8.0 COMMUNITY PARTICIPATION IN DEVELOPMENT ACTIVITIES

Documented evidence on various projects the world over shows lack of community participation as an important limiting factor for the success of these projects. This section, therefore, addresses the issue of community participation in the context of project implementation in the valley. It starts by outlining the need for community participation and presents a range of activities in which the valley people participate. On the basis of study findings, factors limiting and facilitating community participation in the valley are laid out and the role of traditional authorities in enforcing compliance shown.

8.1 The Need for Community Participation

"Participation is a process through which stakeholders influence and share control over development initiatives and the decisions and resources which affect them" (World Bank, 1995). The perception underlying this concept is based on the ideology and principles of the locality development model (an intervention model encompassing many participatory approaches to development). Locality development is a synonym of community development and to some extent, community organization . This model presupposes that community change (and development) may be pursued optimally through broad participation of a wider spectrum of people at the local community level in goal determination and action. Community development is therefore regarded as organized efforts of the people to improve the conditions of community life and the capacity of the people for further participation and self - direction in community affairs.

Community Participation is increasingly being used in development activities as a means to provide an opportunity to beneficiaries of development projects to play a role in project design, planning and implementation. The concept originated from the concern that many failures in community development efforts are due to the lack of community participation in project conception and implementation. Projects were often based on preconceived ideas of outsiders about what local problems are and how these should be solved. Under such arrangements, planning and implementation of development projects was done without the involvement of the communities concerned and without consideration of local cultural and societal attitudes and experiences. This lacked local commitment and support as the activities were not demand driven. In a study on " Designing Community -Based Projects", Narayan (1994) identified three main reasons why community-based development has been adopted as a strategy for improving the lives of people. These are:

- the community cannot fulfil certain jobs or achieve certain goals individually either because of the nature of the goal or benefits;
- beneficiary own limitations in skills, capacity and other resources;
- commonality of interests brings people together .

In addition to the above reasons that make communities work together to achieve certain goals, central governments have of late found it increasingly hard to find resources to

finance everything that is needed for improving the lives of the people. Thus, the general trend now is shifting from central government as the only source of funding to more involvement of community members and adoption of the cost-sharing principle as a way of reducing the financial burden for providing services.

Narayan (1994) identified the following five characteristics of successful community-based projects:

- the group addresses a felt need and common interest ;
- the benefits of working together out-weigh the costs;
- the group is embedded in the existing social organizations;
- the group has the capacity (leadership, knowledge and skills) to manage the projects;
- the group enforces its own rules and regulations.

The strengths of community participation approach in implementing development activities include the following: i) it provides an opportunity for the bottom-up approach of designing and planning development activities, thus allowing community participation in identifying development activities; ii) it strengthens community ownership of the projects. It is thus, this ownership which may lead to sustainability of the projects; iii) it promotes active participation and management of the project by community members; iv) it is a human right central to values of democracy and v) it brings to reality the value of empowerment as it restores people's dignity, confidence, respectability and their willingness to take care of their own affairs:

Community participation in implementing development projects is not without weaknesses. The approach requires an active management team that understands the local norms and structures to be able to use them to the advantage of the projects. In addition, it lacks skilled manpower for highly technical projects such as building bridges and roads which require contracting to specialized firms to ensure standards and quality work.

In order to maximize project success and ensure sustainability, community-based projects therefore require: i) involvement, ii) commitment of beneficiary community members, iii) creation of an environment for the interaction of participating organizations with each other and with the beneficiary communities.

8.2 Community Participation in the Study Area

A review of literature on community participation in Zambia revealed that community involvement is common in rehabilitating social infrastructure such as schools, clinics, water supply, roads and bridges (Ngwisha et.al. 1995; Milimo el.al.1996). The major forms of participation in these activities include: contribution of labour, community mobilisation and leadership on the projects, and to a less extent, contribution of funds towards purchase of materials and payment for specialised local labour.

In assessing the extent of community participation and factors affecting it in the study

areas, household heads were asked to state the type of development activities community members are involved in, forms of participation and the factors that hinder success of community work. In addition to individual interviews, group discussions were held with different communities regarding problems relating to community activities.

The results of individual responses from households are brought together in Table 3.4.1 and Table 3.4.2. From these responses, it is clear that while community members are involved in community-based development activities, these activities are affected by a number of factors that hinder the success. The results in the table show that community involvement is common in all the study areas. These activities involve rehabilitation of social infrastructure like schools, health centres and clinics, health posts, roads and bridges, water supply and dam/weir construction.

The major form of community participation in all these activities are in-kind and cash payments. As a way of contribution, community members make bricks, crush stones, collect sand and fetch water for building purposes. As can be gauged from responses of individual household heads, it is clear that participation in the rehabilitation and construction of schools and clinics are the main activities in which local people participate.

While community participation involves both men and women, women have in most cases specific roles to play. Table 3.4.2 presents the type of activities in which women are involved. The major activity in which women are involved include water, stones and grass collection while men are mainly involved in construction, digging and similar heavy duties.

Table 8.1: Types of Projects Involving Local Communities

Type of Projects	Munyumbwe/Gwembe (N= 587)		Siavonga (N=232)		Sinazongwe (283)			
	Respondents	%	Type of project	Respondents	%	Type of project	Respondents	%
Schools	331	56.4	Schools	102	44.0	Schools	147	51.9
Health Facilities	84	14.3	Health Facilities	52	22.4	Health	43	15.2
Church Projects	4	0.7	Churches	4	1.7	Church	2	0.7
Water supply	43	7.3	Water Supply	10	4.3	Water	35	12.4
Roads Rehabilitation	1	0.2	Roads and Bridges	1	0.4	Dam construction	3	1.1
Dam construction	4	0.7	House Construction	2	0.9	Not Applicable	52	18.4
Others	1	0.2	Storage Granaries	4	1.8			
Do Not Know	116	19.8	Not Applicable	57	24.6			

Source: Survey data, 1997

Table 8.2: Roles of women in Community work

Type of Community Work	Number and percentage of women involved in specified type of community work					
	Munyumbwe/Gwembe (N= 587)		Siavonga (232)		Sinazongwe	
	Responses	%	Responding	%	No. Responding	%
Participating in mobilizing activities	27	4.6	13	5.6	24	8.5
Planning/decision	70	11.9	29	12.5	42	14.8
Food preparation/beer	6	1.0	7	3.0	-	-
Contributing labor	364	62.0	120	51.7	163	57.6
Contributing money	1	0.2	2	0.9	1	0.4
Not applicable/do not know	118	20.1	61	26.3	N/A 53	18.4

Source: Survey data, 1997

8.3 Factors Affecting Community Participation

There are several factors that can enhance or constrain community compliance (Milimo et.al, 1994; Ngwisha et.al, 1996). The main ones include: transparency, information, disputes over project siting, political interference, accountability, lack of coordination, misuse of project funds by project management committees, traditional leadership involvement, non completion of projects and witch craft. The absence or presence of these factors can impact negatively or positively on the effectiveness and sustainability of local contributions towards community based development activities.

While these factors affect community participation in general, there are three major factors identifiable in the Gwembe - valley:

- i. The old promises made by the colonial government at the time of resettlement, make the people in the area feel that the government must provide for everything;
- ii. Politicians also encourage these expectations through political appeasement.
- iii. Lack of awareness campaigns. Currently there are no awareness campaigns to educate community members about the need for their participation. For community members to appreciate the importance of their involvement, awareness campaigns need to be carried out.

Capacity and willingness.

While emphasizing the need for increasing community participation in the area, it is also important to study community capacity and willingness to be so involved. Although local communities may be willing to participate in communal work, they might lack the necessary resources necessary for translating this will into practice. Among the factors undermining peoples' capacity as shown on Table 3.4.5, include limited local skills, lack of leadership and financial resources among others. Although the Gwembe Tonga people are pastoralists, they rarely sell their animals. In addition to keeping animals they are farmers and therefore depend on agriculture for their sustenance. However, the persistent draughts in the valley have undermined this source of livelihood. Although they may be willing to participate in communal works, their daily struggles to just survive counters desire.

In order to help translate willingness into practice, the community capacity needs to be raised. While such an undertaking has financial implications, there is more that can be done without taking up much in terms of resources. For instance lack of skills could, in part be resolved through simple workshops where selected community representatives can be exposed to such skills.

The importance of skills training was also identified by household head respondents who said skill were an important determinant for the success of projects (Table 3.4.6). Other

factors identified as being key for the success of projects, included good leadership, awareness /education and donor support. Thus, in order to ensure successful involvement of the local communities in project implementation, the following issues need to be considered:

- Community awareness campaigns to sensitize locals about the need for community participation;
- Skills maintenance workshops;
- Leadership skills training workshops for traditional leaders;
- Community mobilization for the identified projects.

8.4 The Role of Traditional Leaders in Project Compliance

Cases of non compliance to communal projects had been reported to be common in all the three districts. It is, therefore, important to devise a system of ensuring that communities participate in communal projects. One possible and proven way of doing this, is through the use of traditional authorities. The use of chiefs has been documented in a study by Ngwisha and others(1994) and an excerpt is shown in Box 3.2. The box shows how selected chiefs from Southern and Eastern provinces were instrumental in ensuring that communities participated in communal work.

The history of using traditional leaders in the study areas is varied. For some areas, force is used, while in others, people are just persuaded by showing them the importance of their contribution. While some chiefs are actively involved in realizing community compliance, others have been less active. Chiefs Sinazongwe and Chipepo, for example were instrumental in ensuring compliance to community work.

While appreciating the role of traditional authorities in urging their subjects to participate in projects, peculiar attributes of individual projects may lender some forms of sanctions against non compliance ineffective. The case of Chilindi community in chief Chipepo' area illustrates this (Box 3.1).

Box 8.1: Experiences of communal work in Chief Chipeco Area

In Chilindi, an area in Chief Chipeco's village, people had organized themselves to rehabilitate schools and construct a dam/weir and a health post. Awareness campaigns and support for community participation was provided by CELIM, DEP and the Catholic Church. Although the majority of community members were willing and participated in the projects, a few individuals did not.

Sanctions for enforcing compliance differed for the different projects. While people who had not participated in these projects were required to pay for access to health and education services, it was found that applying sanctions in respect of the dam/weir construction was difficult.

Box 8.2 Use of Traditional Leaders

The method of using the chief has been affected for the community around Mabuyu Primary school and the result has been that people turn up for school work. Villagers were threatened with having their land grabbed from them at Munkolo primary school. The chief was used as well and participation improved, but there has since been a decline of community participation because the chief not consistent. The community said they did not know what made the chief relax

Community Participation at work and the Role of the Chief in Petauke

Tiyeseke, a community-Based Organisation (CBO) in Chief Sandwe's area in Petauke district was formed to organise and manage community -based participation self-help activities. The CBO committee is chaired by the chief who is actively involved in community based activities in his area. For its activities, Tiyeseke gets financial support from World Vision International, which demands that before support is given to any community, the affected community should form the local project committee to organise and manage the activities of the project as well as get active participation in the implementation of the project which presently include provision of unskilled labour, making bricks as well as collecting sand, stones and water.

The activities of Tiyeseke include : construction and rehabilitation of schools, clinics and staff houses as well as supporting women's clubs.

Source :Adapted and abridged from: Ngwisha et.al, 1994

Table 8.3: Forms used for enforcing Community Participation Members

Sanctions applied for non Participation	Munyumbwe		Sinazongwe	
	No.	%	No.	%
Punish by village headman	24	8.3	19	6.7
deny services	14	4.8	13	4.7
Charge for services	17	5.8	46	16.3
take to the chief for punishment	-	-	7	2.5

Source: Survey data, 1997

8.5 Key Partners in Community Participation in the Study Area

Although the communities in the valley may and have on occasions initiated projects on their own, most of the projects are externally conceived. It is important to encourage involvement of the locals in all project stages. Projects based on community felt needs are more likely to succeed. In one instance, the Research Team was informed of a project whose conception, the local community played a primary role. A school PTA identified the need to expand and repair the school and subsequently called for a community meeting, where the issue was discussed and a Task Force formed. The chief was invited at the second meeting. The matter finally reached District Education offices after the proposal had already been completed. At that stage, all the district office had to do was link the project with a donor.

This case was however an exception as most of the projects in the valley are externally initiated and funded. NGOs usually identify a need and approach district officials who provide a link with chiefs and villagers. Such projects have usually only lasted as long as there is funding and employment for local people. Non involvement of the larger local population in major decision making processes also reduces chances of project success. Participation of non-committee members is usually just limited to contribution of materials for project activities. The project management and funding organizations often take the decisions without consultations with the wider community. These shortcomings need to be overcome in order to enhance community participation in the area.

Communities and the external agencies need to form establish/strengthen rapport among themselves in order to maximise their outputs. Among the agencies involved in the valley include the following i) Government (local/and central), ii) Donors, iii) Implementing agencies including Non-Governmental Organizations (NGOs), iv) Traditional leaders, v) Project management teams, including professional/technical staff, vi) Beneficiary/participating community, and vii) Churches. The study identified the following

more or less permanent structures for community participation in the Gwembe Valley: the District Councils, Ward Development Committees, Parents and Teachers Associations (PTA), Neighbourhood Health Committees for Clinics and Health Posts, the new District Health Management Boards, WASHE Committee (for the management of water points) and PAM relief committees which only exist when relief food is being distributed.

Table 8.4: Problems with Previous Community Projects

Munyumbwe/Gwembe (N=587)			Siavonga (N=232)			Sinazongwe		
Problems	Number	%	Problems	Number	%		Number	%
lack of land	3	0.5	lack of land	2	0.9	lack of land	2	0.7
lack of skills	56	9.5	lack of skills	38	16.4	lack of skills	22	7.8
poor planning	9	1.5	poor planning	6	2.6	poor planning	3	1.1
poor implementation	15	2.6	poor implementation	6	2.6	poor implementation	6	2.1
lack of leadership	7	1.2	lack of leadership	5	2.2	lack of leadership	1	0.4
lack of funding	71	12.1	lack of water supply	9	3.9	lack of funding	14	4.9
project siting	6	1.0	lack of cash	3	1.3	project siting	2	0.7
negligence towards work	15	2.6	lack of commitment	1	0.4	negligence towards work	15	5.3
lack of materials	2	0.3	termities	1	0.4	lack of materials	1	0.4
Inadequate labour	2	0.3	not applicable	161	69.4	lack of enough labour	2	0.7
lack of motivation	4	0.7				lack of motivation	1	0.4
misunderstanding	2	0.3				lack of motivation	1	0.4
not applicable	395	67.3				misunderstanding	213	75.3
						not applicable		

Source: Survey data, 1997

Table 8.5: Factors Perceived to be important for Project Success?

Factors	Munyumbwe/Gwembe (N=587)		Siavonga(N=232)		Sinazongwe (283)	
	Number	%	Number	%	Number	%
Good leadership	278	47.4	117	50.4	156	55.1
Community awareness/education	94	16.0	28	12.1	40	14.1
Skill in implementing	5	0.9	8	3.4	2	0.7
Resources for implementing	8	1.4	1	0.4	2	0.7
Outside Assistance	65	11.1	15	6.5	22	7.8
Not applicable/do not know	137	23.3	57	24.6	61	21.6

Source: Survey data, 1997

9.0 SPONTANEOUS RELOCATION SETTLEMENTS

While the major population movements took place in the immediate post dam construction period, a new wave of voluntary migration has taken place in the valley. This section of the report looks at this new phenomenon, which mainly entails the movement of people from the valley to new areas on the plateau. Prominent among these new resettlement areas is Chikanta in Kalomo district. Factors causing the migration waves and the resultant problems faced in the new areas are recounted. Towards the end of the section, water scarcity, transportation inadequacies and the paucity of social services are discussed as the major problems faced by people in the receiving areas.

9.1 The latest Dam-induced Population Movements

The recent movements of people in search of land for farming is increasingly raising serious concern and fears. Thousands of households from Siameja, Mwemba and Old Chipepo villages have left the valley to the upland onto the Chikanta area (Sikaleta-Kansangu) in search of farm land. Some of the people of Siampondo and Sinagombe villages at the foot of the escarpment north of the devil's gorge have moved to Njabalombe Settlement Scheme in Kalomo district due to poor land, low unreliable rainfall and poor accessibility. Other destination areas for these migrants include Chikanta near Kalomo and Sinadambwe in Mazabuka (both within the Southern province) and Mumbwa in Central Province. As already indicated, the major push factor is land pressure which has resulted in limited land for farming and grazing.

Although the land in the receiving areas is good for agricultural purposes, there are a number of problems that migrants are facing in the new areas. The main problem

s are associated with tsetse flies and therefore animal diseases and lack of adequate water supplies. No land use planning has taken place in these areas to prepare for the new settlements. These settlements, therefore, need assistance in the form of provision of basic infrastructure such as clinics and schools. Due to these settlements' proximity to the Kafue National Park, poaching has raised concern.

It is hoped that the voluntary relocation of people from the densely settled areas of the valley to the new areas of Chikanta and others will alleviate pressure on the former and in the process reduce chances of further ecological decay. Although the spontaneous relocation waves have offered new hope for forestalling any further environmental deterioration, relocatees face some difficulties as is evidenced by the case of *Mr. Mapenzi* (not real name) who had migrated from Sinafala village to Chinkanta area but was forced to return after encountering personal misfortunes (see Box 3.1).

Box 9.1 In Search of Land

Mr. Mapenzi, a local villager of Sinafala village is married and has a total of seven children. Sometime back *Mr. Mapenzi* decided to move from Sinafala and settle in Chikanta near Kalomo because of the scarcity of good agricultural land in the former. As is typical of the Tonga, he had a reasonable amount of cattle which multiplied over time. However on his shift to Chikanta, he left the animal in Sinafala because of the fear of losing his animals from diseases that are prevalent in Chikanta, as opposed to his former village in Sinafala which is free of most of the diseases which are prevalent on the plateau. He would only come to collect some of his animals to help with tilling the land and thereafter sell them.

Mr Mapenzi stayed in Chikanta Village for a total of two years (1978-1979). However, afterwards a series of misfortunes struck him and he was forced to return. While in Chikanta, four of his seven children died. He suspected that they had been bewitched and therefore decided to return to Sinafala. On his return, one of his remaining children became mentally disturbed. *Mr. Mapenzi* is now a subject of ridicule among his fellow villagers because of the misfortunes that befallen him as a result of his decision to migrate.

Whereas voluntary migrations could justifiably be encouraged especially in so far as this helps alleviate the pressure on the heavily settled areas in the valley, there is need to also consider the receiving end, in order to not only avoid the same pitfalls that have befallen the valley but also make the place habitable for the envisaged population increase. This could be in the form of establishing water points for both animals and humans, renovating and upgrading roads, renovation of social services, and provision of agricultural extension services.

9.2 Water Supply

In addition to the scarcity of social services, water supply in the area is inadequate. While rivers are the main sources of drinking water for both livestock and human beings, these are not adequate as most of them dry up soon after the end of the rain season. Further more, no dams have been constructed in the area to store water for use during the critical dry periods (September to November). At the moment, there are only two boreholes located at two schools, from which people collect water during the dry season. Due to limited reliable water sources, people walk long distances in search of water. The long distances covered in search of water entails foregoing other productive activities and therefore undermines the economic base of these populations. Any support for Chikanta and other spontaneous relocation areas should put priority on improving water supply. In particular, this support should be targeted towards drilling boreholes(for domestic purposes) and dams (for livestock and small scale gardens).

9.3 Transportation and roads

Chikanta resettlement area in Kalomo is accessed by a good gravel road from Kalomo up to the Mulyambeba turn-off. The road was recently rehabilitated under a project run by the MAFF. From the turn-off to the actual resettlement area, Kandanzovu, the road is earth and in bad state. The condition worsens as you approach the resettlement area. The road becomes impassable during the wet season making the transportation of inputs and produce to the market very difficult. This, in most cases results in farmers being unable to sell their produce or selling it at prices below the cost of production for fear of it going to waste due to lack of storage facilities.

The run down road would result in high transport costs which could lead to high input costs in the area and therefore render the local farmers produce uncompetitive. The road, therefore, needs to be maintained in good condition in order to avert the escalation of production costs. In addition, low vehicle operating costs resulting from good roads will encourage transporters to introduce conventional road passenger transport services to the area.

The road to Kalomo provides the shortest route to town. The Choma route is longer and would, therefore, cost more in terms of rehabilitation and maintenance. The Kalomo road should, therefore, be given priority in the project while the Choma road could be considered for future projects. The Kalomo road is adequate for access and for general transportation purposes. Rehabilitation of the Mulyambeba road will benefit both the local community and the relocatees in that it will serve all the villages along the road up to the resettlement area. This will improve agricultural production and marketing of both inputs and produce.

There is no reliable form of public transport in the area. People depend on open vans which are often unregistered. A single journey from Chikanta to Kalomo costs K3500 while that to Choma is K6000. Most of these vehicles do not meet safety standards for passenger transportation. There is a lot of traffic to the area particularly during the harvesting season when farm produce is sold to buyers from as far as Lusaka using trucks and vans.

Due to the availability of fertile land, the people in the area are economically better than those in the Gwembe Valley. They are able to produce surplus for sale. Cattle ownership also appears to be reasonable. It would, therefore, be easier to encourage production of ox-drawn carts for transporting people and their goods to and from the main road and for other daily transport needs. It is, therefore, recommended that a workshop be set up in the area for the production of IMTs and other related products as recommended for the Gwembe Valley.

9.4 Provision of Social Services in Spontaneous Areas

Although the people who have moved to Chikanta area have found good farm land for their farming activities, they are not happy with the level of provision of social services. Access to health services for instance, is reduced by long distances which people have to travel to get to the nearest facility. There are very few school and health facilities and those available are located at long distances. Very young children walk long distances to reach the nearest school. Because of the scarcity of upper grade primary schools, most of the children do not go beyond lower primary school. For health care, people usually have to walk to Macha Hospital (a journey which takes about two days by foot, which is a common means of travel in the area).

10. SUMMARY OF MAJOR FINDINGS AND RECOMMENDATIONS

Roads Rehabilitation

The most important means of transport in the study area is walking. Although there are a number of vehicles, many people lack the requisite economic means for utilizing the vehicles. Other means of transport include sledges, bicycles, and ox carts. In order to increase the utilization of these intermediate means of transport, it is imperative that the road network in the area is improved. With such improvement, other commercial activities would take off and thus improve the living conditions of the Gwembe people.

As with other road networks in the country, those in the valley are run down. The bottom road, which is an important line linking all the districts in the valley and would, if renovated provide the shortest route among these districts is completely run down and would be very costly to renovate. From discussions with various key informants and community groups, it was very clear that renovating this and other roads was a priority for the locals. The Bottom road would shorten the time taken to travel among valley the districts and therefore result in reduced average costs. This in turn would enhance the valley products' competitiveness and facilitate easier transportation of goods and services.

- i) The major recommendation here is the Bottom Road which would provide the most convenient link among the valley districts;
- ii) Because of the low level of traffic in the Valley, it is recommended that feeder roads are maintained in their gravel or earth form;
- iii) The road from Chisekesi to the Gwembe old Boma is in good condition, but it deteriorates after Gwembe Old Boma. It is recommended the stretch from Old Boma to Munyumbwe is renovated.

Irrigation and Water Development

The study findings show that the Gwembe Tonga who still practice recession agriculture have little or no access to information regarding the flooding patterns of the lake for them to meaningfully plan their farming activities. It was found that although farmers are still practicing recession agriculture, productivity was low and that there is very little information flow to farmers with respect to meteorological and hydrological data. The minimum use of improved technologies in small scale agriculture and absence of information on meteorological and hydrological data has compounded the low agricultural productivity and resulted in the area facing chronic food deficits.

Paradoxically, despite the construction of the dam, the valley is dodged by scarcity of water. Water sources are inadequate in both quantitative and qualitative terms. A graphic illustration of the former is evident in Lusitu area, where, although villagers have piped

water from the dam, the water is unfortunately not treated and therefore exposes them to water-borne diseases. For the majority of the other valley residents, rivers and streams are major sources of water for both humans and livestock. Water improvement in the valley is therefore important and should be accorded priority. However, there is no adequate information about the best way of providing water to the valley people since out of an initial borehole population of 84 in Siavonga district, only 34 currently yield water. A study to ascertain the most optimal way of providing water would therefore have to be undertaken. ZRA/ZESCO should provide data on when the reservoir could be expected to recede and fall. The Outreach Officers should then use this data to feed back to the MAFF and individual farmers. Other recommendations are outlined below.

- (i) Pilot project on recession agriculture for the Gwembe Valley;
- (ii) Water Supply Improvement for the Gwembe Valley in order to improve coverage and accessibility to reliable water sources;
- (iv) Pilot project on low cost water treatment (purification) for small communities in order to improve the quality of water;
- (v) Pilot study on rain harvesting. This will facilitate conservation and utilization of rain water.

Health Facilities and Programmes

Partly because of the construction of the dam and the general deterioration of the economy and consequent social decay, health conditions in the valley have taken a downward turn. Demographic indicators too have responded to these fluctuations and this has in turn altered the lifestyle of the Gwembe people. The practice of polygamy for instance is less widespread now, although average family size has remained fairly large.

Long distances between villages and health facilities have also compounded health conditions in the valley. Some areas are not as well served with health facilities as others. As a result of the scarcity of health facilities, utilization of health services is below par. While almost half the household respondents said their first point of call for medical care was a health center, a significant proportion opted for self medication. In order to increase the uptake of care from the modern sector, there is need to upgrade and construct health centers, while at the same time implementing supplementary measures such as roads rehabilitation and construction, which improve accessibility.

The declining economic conditions and attendant broken down social infrastructure provide fertile grounds for the spread of both old and new infections. Public health programmes though available, could, if revitalized improve community conditions. One such area is family planning whose utilization could rise, if it is widely publicized given the high proportion of respondents who never planned to have all the children they had at the time of the survey.

Other public health programmes targeted at negative offshoots of the dams construction are also worthwhile. The construction of the dam resulted in novel business opportunities,

prime among which was commercial fishing and in later years tourism from both within and outside the country. Unfortunately these opportunities have come at a cost. They have compounded the spread of STD infections and recently proved a good base for the spread of HIV/AIDS. Public health programmes in these areas will therefore need intensifying. Specific recommended projects are itemized below.

- i) Upgrading and Construction of Siameja Rural Health Center;
- ii) Construction of a Health Center at Sulwegondwe;
- iii) Rehabilitation and provision of water supply at Chabbobboma Health Center;
- iv) Completion of Health Post at Sinafala;
- v) Implementation of Public health programmes in HIV/AIDS and Family Planning. This will help forestall the spread of these diseases and in part improve the health status of mothers by averting unwanted pregnancies.

Land Use and Agricultural Development

An immediate effect of the dam's construction was the increased pressure on land occasioned by both human and livestock demands for agriculture and grazing respectively.

Landlessness has become a major problem in the valley. This has recently been compounded by an increased interest in land purchasing. The demand for land has in the recent times led to the voluntary relocation of people to other areas on the plateau.

Agriculture and Animal husbandry are important activities in the valley. Fortunately the area is free of major livestock diseases and animals thrive. Other sources of income, although relatively less important than agriculture include fishing, hunting, handicrafts, basketry and selling of wild fruits. Although fishing is a major occupation in the valley, very few of the local people are involved in it on a large scale. It is mostly dominated by people from other parts of the country.

Given the importance of agriculture in ensuring food security, programmes should be designed to provide incentives for improving agricultural production. This would entail infrastructure development, improvement of extension services, research into issues of food security such as the pest problem among others. Projects into animal husbandry and micro projects for following up on issues that may need further investigations during the course of project implementation are also recommended.

- i) Support of Agriculture Extension Services and Land Husbandry.
This will involve supporting Rangeland Improvement; Watershed Management; Food Storage Improvement; Pest Control; Soil Conservation; Agroforestry and Early Maturing Crops.

- iii) **Support for Demand-driven Research.**
Involves research support for the control of crop pests especially armored crickets and birds. Also included is support for Organic Manures, Sesbania, Leucaena, Acacia Albida, and Treatment of animal manure.
- iv) **Low Irrigation/Water Management Technologies.**
Aimed at improving Recession Agriculture Practices, Irrigation Technologies and Outgrower Schemes.
- v) **Micro-Projects Support (Joint Venture with villagers).**
Will entail establishment of better Marketing for crops and livestock, Small Scale Industry Development and Youth Programmes, Community-Managed Wildlife Sanctuaries Development, Game/ Livestock Fencing, Gemstone Mining, Support for Local Fisheries Development and Protection and Improvement of Archaeological and Historical sites.

Spontaneous Relocation Areas

The voluntary relocation of people from overpopulated areas of the valley to more spacious settlements on the plateau is a phenomenon that provides hope for forestalling further environmental degradation in the valley. Although the receiving areas for these spontaneous relocatees are relatively better than those in the valley, they also have their own shortcomings. The following recommendations are made to not only make the place more hospitable but also address some negative offshoots of the resettlement.

- (i) Although the main road from Kalomo to Chief Chikanta's palace is in a good condition, the road to Mkandazovu, where most of the relocatees live is in dire need of rehabilitation. It's rehabilitation will facilitate the movement of goods and services and particularly the area's abundant agricultural produce.
- (ii) Another priority area needing urgent attention is provision of water. There are hardly any boreholes or dams in the area and this has an adverse effect on both humans and animals. There is, therefore, need to provide water to the area.
- (iii) Since the area has been spontaneously settled, it was not planned for and therefore lacks basic services. In Mkandanzovu, a self help school has limited space and pupils can only continue higher grade schooling in schools elsewhere. The area too has no health facilities. These social amenities need to be provided.
- (iv) There is need to help the Ministry of Agriculture improve extension services in the area. Furthermore, the settlements are near a game park and cases of poaching have been reported. It is therefore proposed

that game management be improved through joint ventures with the affected communities.

Community Participation

Current forms of community participation, factors hindering or enhancing the involvement of local communities in development activities were studied in order to propose a system of involving local people in rehabilitation and development programmes. Present activities in which communities are involved include rehabilitation of schools, clinics, roads, bridges, dams and church work. A number of factors undermine people's participation in community projects. These include promises made by the colonial government at the time of the dam's construction and occasional political appeasement which results in the locals always expecting the government to meet their needs. The absence of community awareness campaigns also undermines local involvement.

Although traditional authorities are key in enforcing community involvement, the chiefs in the valley were not actively engaged in this, except for Chiefs Sinazongwe and Chipepo. When designing programmes for the involvement of communities, it will be imperative to use chiefs in order to ensure maximum participation. The experiences of Chiefs Sinazongwe and Chipepo could be replicated to other areas. Efforts aimed at enhancing the involvement of local communities should be encouraged so that the villagers have a sense of ownership of projects. In designing a model for community participation, the following strategies and structures are proposed.

- i) There will be need for Community Awareness campaigns before the implementation of projects. This will enable the communities to be aware of the imminent projects and therefore allow for their involvement in these activities.
- ii) The Beneficiaries should be involved in all stages of the project cycle. This starts with the conceptualization of the problems and identification of possible programmes, implementation and monitoring of the same.
- iii) Because of the need for the assimilation of leadership skills by traditional authorities, it is proposed that Leadership Skills Training workshops be conducted, in addition to Skills Maintenance workshops for artisans.
- iv) While a Management Unit charged with running the overall project will be formed, it is proposed that local committees be formed to oversee the actual implementation of the projects and as a way of maximizing their input in the process. A Village Development Committee for catchment populations should be instituted.
- v) In addition to the Village Development committee, there should also be a Project Development Committee which shall encompass chiefs and all headmen in their catchment areas. These committees shall primarily be responsible for enforcing community participation.

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Appendix 1. List of Selected Key Informants

1. Hon. Mr. F.Hapunda, MP.
2. Mr. Simamba, Acting Siavonga Council Secretary.
3. Mr. A Kasenzi, Project Coordinator, Harvest help Zambia.
4. Mr. Manyanga, Siavonga DHMT member.
5. Mr. A Mushinge, Siavonga District Geographical Information System Manager.
6. Chief Chipepo.
7. Mr. Munkombwe, District Council Secretary.
8. Regent Chief Chipepo.
9. Chief Sikoongo.
10. Mr. Nkunyi, Chipepo Health Centre Environmental health Technician.
11. Chief Sinazongwe.
12. Chief Mweemba.
13. Mr. Musanya, Coordinator, Gossner.
14. Reverend Madyenkuku
15. Chief Chikanta
16. Kalomq District Agricultural Coordinating Officer

