

**SURVEY OF AN INLAND COMMUNITY OF KAVANGO
MBORA VILLAGE**

July 1995

by

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MBORA COMMUNITY SURVEY

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1. INTRODUCTION

This preliminary community survey follows the Kavango Farming System Research Team's (KFSRT) district profile and initial site selection activities (see KFSRT reports describing these activities). In its first year of operation KFSRT plans to begin adaptive research activities in one river and one inland community. Mbora was found to be representative of a typical inland community situated on a dry riverbed, 'omuramba', and was selected as a focus study and adaptive research area after discussions with the local Chief, Councillors and with the community themselves. It is planned to begin adaptive research activities with the community later this year. The aims of this survey were:-

- to deepen our understanding of the socioeconomic structure and agricultural activities of an inland community
- to collect information which allows research topics to be prioritised jointly by farmers, researchers and extensionists.
- to identify farmers to participate in a collaborative research process
- to develop a good relationship with the community

2. METHODOLOGY

The team spent ten days carrying out fieldwork in Mbora from July 17th - July 28th. Discussions and final analysis was carried out on the 31st July (see Appendix 1 for timetable). Writing up was carried out by the KFSRT core team on August 15th -18th.

The research team consisted of representatives from research, KFSRT, CANAMCO and the Kavango Regional Farmers Union:-

Johannes Simbombo - KFSRT Extension Technician
Klemens Hatutale - KFSRT Extension Technician
Harriet Matsuert - KFSRT Social Anthropologist
Selma Nitembo - MAWRD Agronomist
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Solomen Cooper - MAWRD Research Technician
Dr David Gibbon - Agronomist, University of East Anglia (visiting consultant)
Martha Hashipala - CANAMCO Field Coordinator, Mbunza District.
Pelageas Hamusira - National Namibian Farmers Union
Ly Boun Tieng - Horticulturalist
Frank Matsuert - video & photographic recording.

We were also joined for some activities by Mike Olway, Agriculture Teacher at Levi Hakusembe secondary school and by grade twelve students: Johannes Kayimbi, Erastus Kalimbwa, Teresia Kasanga, Alba Ngondo.

Methods used in the survey were:-

Community meetings - 3

Household interviews - 23 interviews carried out. (15 plough owning households, 8 no plough households)

Focus discussions with local experts

Specific research tools used were:-

Information Needs	Research Tools
Socioeconomic characteristics	Identified household types through:- social mapping & wealth ranking (community meeting) Gender analysis (research team) Interview with health project Food security - food calendars (household interviews) Farm Profiles (individual households) (see Appendix 1 for copy of farm profile checklist)
Control and management of resources Decision making	Land use map Venn diagram of community decision makers (group) Resource management matrix (group) Seasonal calendar (individual household) Income/spending matrix (individual households)
Main enterprises and trends (discuss different enterprises with 'experts' identified in above exercise)	Historical profile (group) Transect walk (group) Farm profiles Ranking of enterprises (individual households and community meeting)
Constraints and opportunities of most important enterprises	Focus discussions with local experts Force field analysis.(community meeting) Ranking of problems (group) Problem Trees (core causes of constraints identified) (groups)
Identification of possible research areas	Solution tree (for major issues) (groups) Further discussion by Research team on research, extension, training and other needs and opportunities.

Paula Keen, CANAMCO Forester, helped us with the botanical names of useful trees identified in the village. She is in the process of setting a data base of local trees, their botanical names and uses.

The community meetings were filmed by Frank Matsuert. The videos formed a useful tool for evaluating methods used. We hope to use this footage together with filming of later adaptive research activities in the village as educational material for researchers, extensionists and farmers in other areas.

The survey was carried out at the end of the harvest period. The advantage of working in the community late in the season was that people had time available for meetings and discussions. The disadvantage was that the team were not able to see crops growing on the field. However, we plan to follow up this initial survey with monitoring of crop performance and management over the next season.

The methodology was evaluated by the team on the last day of the survey:-

Strengths

Community participation was very good.

Researchers and NGO staff made a very valuable contribution to the analysis of information
CANAMCO Mbunza coordinator found the survey useful in increasing her understanding of
Mbunza inland areas.

PRA methods were very helpful in increasing our understanding of farming systems
Researchers, extensionists and NGOs learn from each other - interdisciplinary team was useful.
Videoing was useful in recording and helping us to evaluate the group meetings.

Weaknesses

Participation of women in discussions is poor when the facilitators are male.

No Mbunza extension officers were able to attend the survey. *Why not?*

Timeliness of team members was often poor (due to some people staying in Rundu?)

Researchers from other areas would have preferred to work through the weekends, while local staff prefer to take the weekend off.

Windy weather made PRA exercises difficult at group meetings.

Visual aids - we are not sure if those drawn by the team were clear enough.

We gave a light sandwich lunch to the farmers on the days when we had group meetings. Some team members were worried that this could create dependency/expectation problems.

Recommendations for future surveys

More women facilitators on the team

Residential - everyone should stay in the same place to improve timeliness.

We should prepare some visual aids & a flannel board for the next survey

Invite chief of extension and chief of research to the final community meeting.

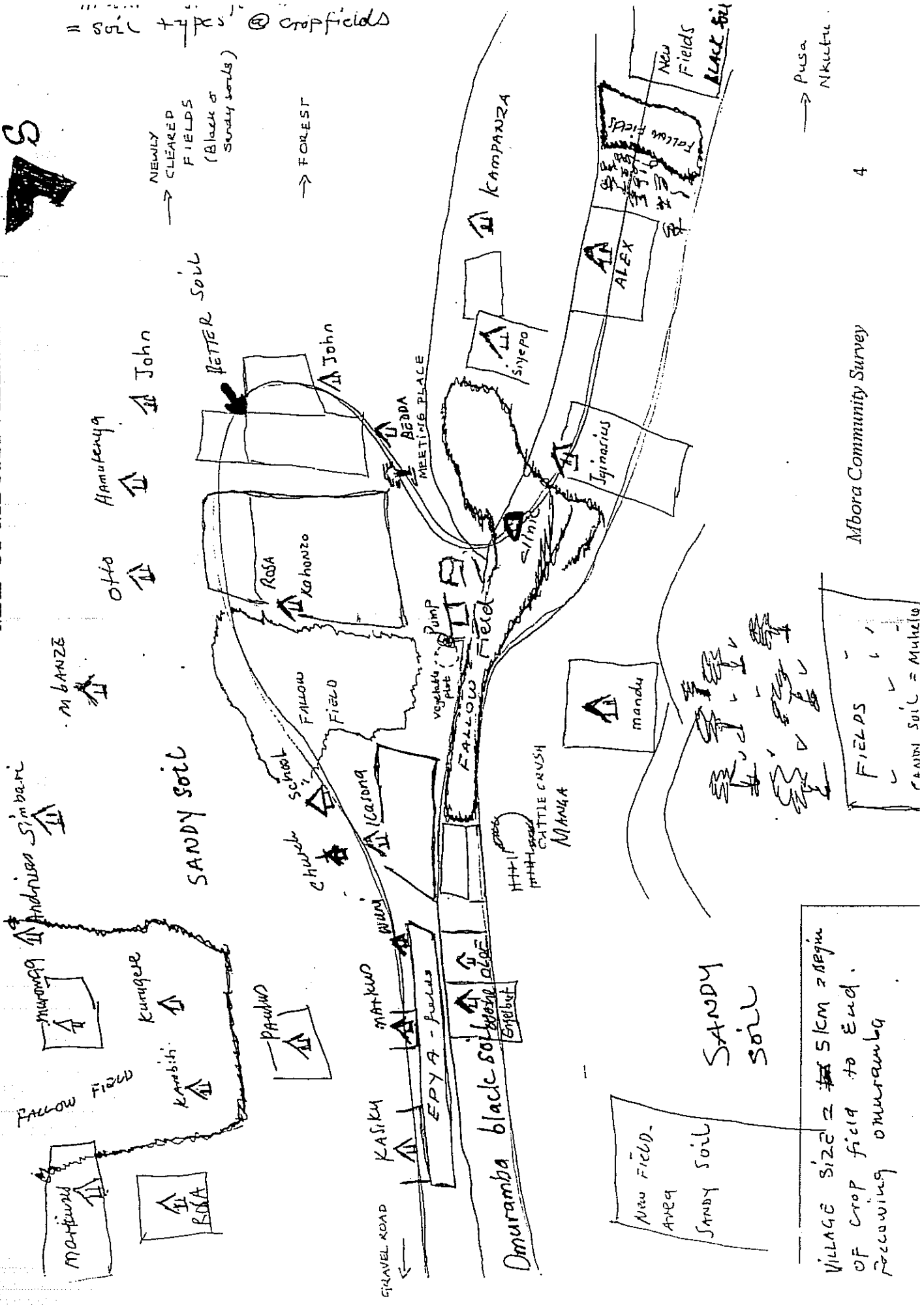
Use video and show it to the community

Limit food and drink provision

MAP OF MBORA VILLAGE



"soil types" @ Crop fields



VILLAGE SIZE = 5 km = begin of crop field to end. Following Omuramba

→ Pusa Nkutu

3. DESCRIPTION OF VILLAGE - NATURAL RESOURCES & SOCIOECONOMIC FEATURES

Mbora village is located in Mbunza district to the West of Rundu. The village approximately 40 km from Rundu, and inland 7km from the gravel road, along a sandy track running along a dry riverbed (*omuramba*). The village stretches 5km along the *omuramba* with compounds situated on either side of the road. This area was originally inhabited by bushmen, it was first settled by Mbunza people in 1963, when a wind powered pump was built there. These settlers came from riverside communities (Halili, Bunya, Siya, Sinzogo). Most of the present day villagers are also from these villages, and also from Nkutu (further inland). The reason for moving to this area was to find better soil and grazing land. Two bushman families remain in the village.

The primary school was opened in 1970. In 1975 many Angolans came to this area to escape civil war in their country. They brought with them cattle infected with lung disease which infected and killed many of the villagers cattle. During the Namibian Liberation Struggle (1980s) the borehole was broken by the South African army. Lack of water and fear forced people to move back to the river. In 1988 an engine pump was installed at the borehole, and people began moving back to the community. Today there are 29 households in the community.

Today, many of those farmers who first settled in the village have cleared land further inland and begun to settle there. They hope that they will get their own borehole in the near future, though at present they continue to use the Mbora pump. Only farmers with livestock can settle further inland, as oxen and transport are needed to collect water.

3.1 INFRASTRUCTURE

There is a primary school in the village (up to grade 4?) and another primary school at Halili (up to grade 7). The nearest secondary school, Levi Hakusembe is 12 kilometres away, on the gravel road.

There is no shop in the village. People go to the river communities or to Rundu to buy goods. There are no cuca shops. *Kasipembe* (mangetti liquor) is brewed and sold by individual households.

A health committee was formed in the the village in 1992. The Mbunya mission runs a mobile clinic to the village and is currently training community health workers. There are 3 traditional birth assistants and at least 3 traditional healers working in the community. The Mbunya clinic fee is \$6. Hospital bed costs \$10. Vaccinations, TB, leprosy and antenatal care are free. Traditional health care is often much more expensive.

There are two churches: Catholic and Protestant.

The borehole is managed by two men. It was broken down for most of the time we spent in the village. The village have been asked to form a borehole committee by the Water Supply team.

There are 19 ploughs in the community (owned by 15 households). Those who don't own ploughs can gain access through the 'nzambi' communal labour system where ploughing services are exchanged for *kasipembe* liquor.

HISTORICAL PROFILE OF MBORA COMMUNITY (Community Meeting)

Years	Main Events	Decision makes	Crops	Health or Diseases	Animals	Road & Transport	Rain or water	Future.
1963 to 1968	Good yields many cattle plenty wild fruit. Four villages	Homyra Kasiki Headman Silas.	Pearl millet Sorghum Maize Cowpea Groundnut Pumpkin	Kankwonyo Madambini Esokora Nkwongu - Mburungu Clinic.	There was plenty	Nakuye road. Less cars used sledges + water. Sand road.	Good rainfall period plenty water	
1969 to 1973	started to get poor yields - soil and rain problems. Sch gor started Villages increased - 20.	Homyra Nepemba	As above but started to seed a new millet w/ Colech Da wureni from Bots wana.	As above	Were plenty	Gravel road - people gravel with bows kets, Received maize aft working		
1974 to 1979	Still poor yields water se rious a people moved back to the river	Homyra Leevi	Poor yields crops as above	As above	Poor fled war	Beter more cars and beter roads	Not so good	Aid not know how because of the war Swapo.
1980 to 1987	Problems of drinking water started. Pumps broken or damaged by the whites (Chimies) → Swapo must not use that water.	Homyra Leevi	As above but poor yields.	Malaria and as above.	Fled far in the inland m-war	Good road and more cars.	Poor	started to see face better future -
1988 to 1990 and up to date.	School children nothing money to pay more children have sat at their parents.	Leevi	The above ones and the new er, Okashana		Cattle died to much because of lung disease there are re due to the cattle from Angola	As above	Poor and water problems	- crop seed will wash. - wild fruit - animals - trees - grass - No rain because no trees grass ect. starving - face poor bad future

In community meetings, villagers indicated that lack of transport is a serious problem for them. There is no public transport to community, though buses do run along the gravel road. The local means of transport is by canoe or sledge pulled by oxen. Sledges and canoes are inefficient carriers, requiring many animals to pull a heavy load. Those farmers with no livestock must borrow from others or go by foot. Lack of transport effects the ability of non livestock owning households to cultivate new land inland from the village (no transport to take water to the field for human consumption), it also creates problems in marketing and for getting people to health care when they need urgent treatment.

3.2 NATURAL RESOURCES

The village is surrounded by forest and wild fruit is plentiful (See Appendix 3). However, trees are decreasing because of forest fires.

Wild animals were plentiful in this area but have decreased due to the war and to hunting.

Soils: black soil (loamy sand to loam) in the *omuramba*. In other areas soils are sandy. The black soil is more productive; millet, sorghum and maize grow well and the soil can be cultivated for longer than the sand (10 yrs before fallowing). However, the sandy soil can be ploughed more easily when rainfall is low as it is less compact than the black soils. Many trees grow on the sandy soils. All but mangetti are cut when the land is cleared. On the black soil there are smaller shrubs only. These are all cut when the land is cleared.

An area of black soil, in the centre of the village has been abandoned (because of *ngwena* weed, low fertility and movement of owners inland).

Most fields are not fenced and cattle are allowed to graze freely on them after harvest.

3.3 SOCIOECONOMIC CHARACTERISTICS

Villagers are mainly of the Mbunza tribe, with two bushman households. Languages spoken are Kwangali and Shimbundu. The population is approximately 197 people, with 12% out living out of the village at present. Those absent were mainly working in towns or studying at secondary school. In some households the grandparents were looking after grandchildren while parents were away working.

Household size ranges from 1 to 18 family members. The average household size is 7. The extended family is the normal household type. Sons can remain with their parents after marriage, but will sometimes chose to start their own compound. There are two female headed households in the village (both widowed).

Plough ownership was found to be an important criteria for wealth, and could be associated with a number of other household characteristics:- (see systems interactions for plough and non plough owners in section *)

No Plough	Plough Owners
Average household size 5 people	Average household size 9 people
Mostly younger households	Tend to be older household heads (40+)

Lack of capital to invest in ploughs or livestock.	Most households have, or have had, a family member in formal employment. This has provided capital to invest in ploughs and for other enterprise development.
No livestock, except sometimes a few chickens.	Have livestock: cattle, goats, chicken and sometimes pigs
Can cultivate small areas of land only, because of late access to plough.	Large fields cultivated.
Have lost traditional seeds because these are consumed in times of hunger. Few crop varieties grown.	Wider range of crops and crop varieties
Exchange wild fruit, forest and river products and <i>kasipembe</i> for food, clothes and ploughing services.	These households are more likely to have newly cleared fields and homesteads further inland from the village.
Depend on few enterprises and are less food secure than plough owners	
Have transport problems because no livestock. Cannot cultivate new fields inland because have no transport to carry water. Are forced to cultivate degraded land around boreholes which has been abandoned by first settlers.	
Dependence on plough owners - many are related to plough owning families.	
Greater dependence on common resources.	

See figs 5 and 6 for systems diagramming of the main enterprises and interactions for plough owning and non plough owning households.

15 of the 29 households in the community are plough owners. Of those interviewed who didn't have a plough, at least three households were related to plough owning households and got access to ploughs (and other resources) through them.

Food security can be a problem in this community (see fig 3 food calender), and eating stored seed stocks during the hungry summer months (November to March) was given as a reason for the loss of traditional varieties. Wild fruit play an important role in helping families survive this period (eaten by the family or exchanged with richer households or river communities for food). Bean/cowpea leaves, mutete (wild vegetable) and cucurbits (leaves and fruit) are also important part of the diet during this time. Fish is eaten throughout the year and is an important protein source.

↳ from where?

Main health problems in the community (from interview with Mbunya clinic staff) are:-

Malaria - pregnant women and children particularly affected.

Diarrhoea

Wounds - snake bites and burns

Red eye

Coughs and colds in winter

TB

Whooping cough & polio (unvaccinated children from Angola)

Malnutrition

Alcohol abuse

Fig 3. Food Calender

Example from household interview with no plough household

FOOD	SPRING (Sept/Oct)	SUMMER (Nov-May)	WINTER (May-Sep)
MARORO	••••• 5	•••••••••• 6	
MAKUNDE (BEANS)	••••• 4		
NONGONGO (MANGETTI)	•••••••••• 11	•••••••••••••• 6	•••••••••••••• 12
SIKOMBO (GOATS)	••••• 3	••••• 3	••••• 3
MATANGA (CUCURBIT)	•••••••••••••• 9		•••••••••••••• 14
MILLET MEAL	•••••••••••••• 12	••••••••••• 5	•••••••••••••• 10
MAIZE	•••••••••• 5	••••••••••• 5	••••••••••• 5
FISH	•••••••••• 4	•••••••••• 3	•••••••••• 3
NONSIVI	••••••••••• 8		••••••••••• 8
MAGUNI	•••••••••••••• 10		
N'GOMENE (BAMBARA)	•••••••••••••• 10		
MASINI (MILK)		•••••••••••••••••••••••••• 35	
RUPOTERA (SQUASH) LEAVES & FRUIT		•••••••••••••••••••• 16	
MALIANWA LEAVES (PUMPKIN)		•••••••••••••••••••• 16	
BEAN LEAVES		•••••••••••••••••••••••••• 19	
BEEF	•••••••••• 4	••••••••••• 4	••••••••••• 4
MUTETE		•••••••••••••••••••••••••• 19	

Began to buy maize meal.

Least food

Most food - most variety of food

NOTES:- * No of seeds •• denotes importance rather than quantity NB during this of least food overall. mangetti nut pounded and added to water. maize - purchased when there is cash available. Millet - no harvest this year, Sorghum & maize also failed. Wild fruit and legume leaves very important during these summer months. Noncumba and motu becoming more scarce due to fire. Diant plant down or bambara as no seed. Will buy from neighbours.

* Note importance of legume & cucurbit leaves, wild fruit & vegetables, and milk during the hungry period.

4. RESOURCE CONTROL AND MANAGEMENT

Decision makers in the community (from community discussion)

	Responsibilities
Foreman - elected by the community	Village organisation (including health and pump committee) Livestock (people must get a signed note from the foreman confirming ownership before selling their cattle) Forest - forest burners reported to the chief. But is difficult to catch them. Link with the district chief
<i>Masimbi</i> - headman's advisers (old people of the community)	Advise the foreman, and act in his place when he is absent.
Teacher	Health committee
Muna pomba - pump man	Management of borehole
Health Committee	Coordinating health activities & health workers.
Livestock Owners	Grazing Management
Female household heads.	Seed Storage and selection.

4.1 DIVISION OF LABOUR

	Reproductive Activities (household management and social functions)	Productive (income and food generation)	Community Management
Women	Cooking, fetching water, firewood, fruit, fishing, processing mangetti nuts, chicken and crop production, basket making.	<i>Kasipembe</i> , casual labour (casual labour), wild fruit sales, chicken sales, formal employment, (livestock ownership).	Health workers, Baptist women's group.
Men	Firewood and fruit collection, water collection with sledge, fishing, housebuilding, hunting, ploughing, herding, (crops).	Casual labour, hunting, fishing, wild fruit, ploughing, herding, <i>kasipembe</i> , (livestock), formal employment, carpentry and blacksmithing.	Health workers.
Older Women	As for younger women + pension contributes to food, health care and education.	Pension, <i>kasipembe</i> , casual labour, chicken sales.	<i>Masimbi</i> (if head of household)

Older Men	Pension + advisory role.	Pension, livestock, casual labour.	School committee, village committee, borehold committee, <i>masimbi</i> .
Boys	House building, (crops), fishing, wild fruit, ploughing and hunting.	Fish, casual labour, chicken sales.	
Girls	Cooking, fish, fetching water, wild fruit, (crops)	Casual labour, chicken sales.	
Household heads	School fees and medical bills, provide food.	Livestock (responsible for decision on sales). Crop sales.	As for older men and women.

Nzambi system - communal work party - is used for agricultural activities such as land preparation and weeding. In the river community surveyed, this system has been largely abandoned to be replaced by paid labour - casual labour. Casual labour in Mbora community appeared to be mainly working for the school teachers. See figure 4. for seasonal calender of activities.

4.2 OWNERSHIP OF RESOURCES

Livestock can be owned by different family members but sale is controlled by the household head. Land is owned by those who first cleared it. Some of the land in the village itself was cleared by the first settlers and abandoned. Some has been given to younger relatives who now live in the village. Each married woman manages her own field, with advice and labour provided by male household members and children.

4.3 INCOME AND EXPEDITURE.

Four rankings of income and expenditure were carried out. The most important sources of income for the plough owning households were:-

- Salary
- Pension
- Livestock
- Casual labour
- Millet
- Sorghum
- Kasipembe*
- Remittences (from working relatives)

Most important for the non plough owning household were:-

- Mangetti nut (sold as nut and *kasipembe*)
- Casual labour
- Millet.

Most important expenses (top 3 given by each household were:-

- Food (no. 1 for all)
- Health
- Clothes
- School

Fig 4 Seasonal Calender (prepared by one household)

Activity	SUMMER					Autumn			WINTER		Springs	
	Nov.	DEC.	JAN.	FEB.	MAR.	Apr	MEI	JUN	Jul	Aug.	Sept.	Oct
Ploughing (planting)	♀♂ ⊕											
WEEDING		♀										
CROSS-CHECK Epemba						♀♂						
HARVESTING								♀♂				
THRASHING								♀♂				
LAND Clearing	♀♂								♀♂			
HERDING		♂ ⊕										
Vacinating						♂ ⊕						
Wild Fruitē						♀♂						
Nongongo						♀						
Nonsivi		⊕ ♂ ♀										
MAKWEWO						♀						
Nonsimba												
MATU	♂											
Maguni	♂♀⊕								⊕♀♂			
MARORO	⊕											
House building									♂			

♀ = women
♂ = men
⊕ = kids

NOTE:

5. MAIN ENTERPRISES

5.1 ENTERPRISE RANKING

Enterprise ranking was carried out in the second community meeting.

No. 1

Cattle*, goats*, chicken
Millet, maize, squash, melon.
Casual labour
Kasipembe & Mangetti nuts
Baskets (*ranked high because they play an important role in other enterprises*)
Blacksmithing
Woodcarving

No. 2

Formal employment* (*few people only, so ranked in second group*), pension, dog selling.

Sorghum, bambara nuts, groundnuts, beans, pumpkin
Canoe (*important role in other enterprises, can be used on the river and on the ground*)

No. 3

Mutete (*used for food or cash*)
Pigs*

No. 4

Wild fruit
fish

No. 5

Wild animals
Honey
Castor

* Plough owners only. See figures 5 and 6 for systems diagramming of main enterprises for plough owners and non plough owners.

5.2 CROPS

CEREALS

MILLET

Varieties

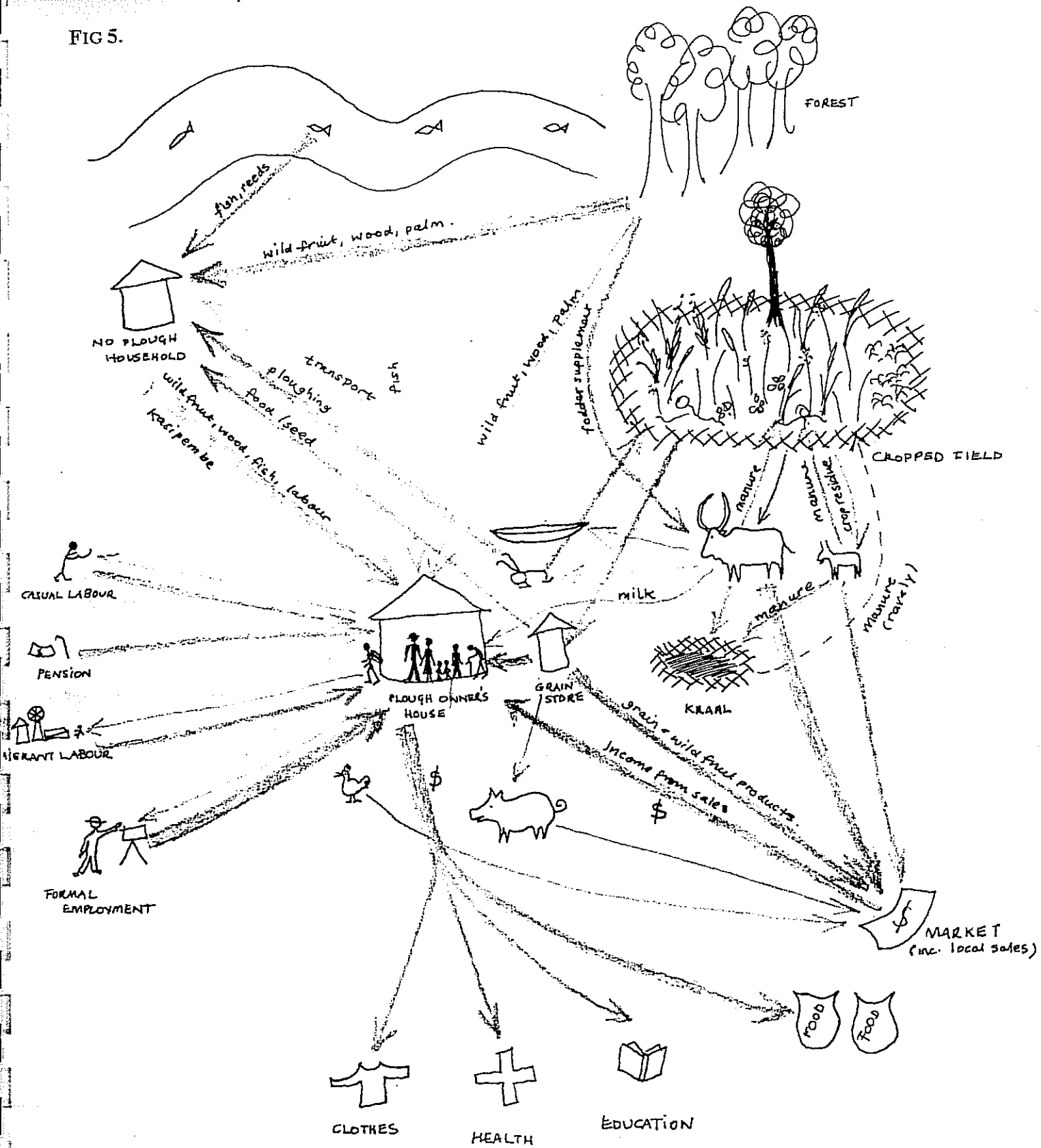
Local variety (grown by most farmers)

Daureni, Kakunya, Mantora, Horomende (bristly) (grown by few farmers only)

Okashana (2 farmers only)

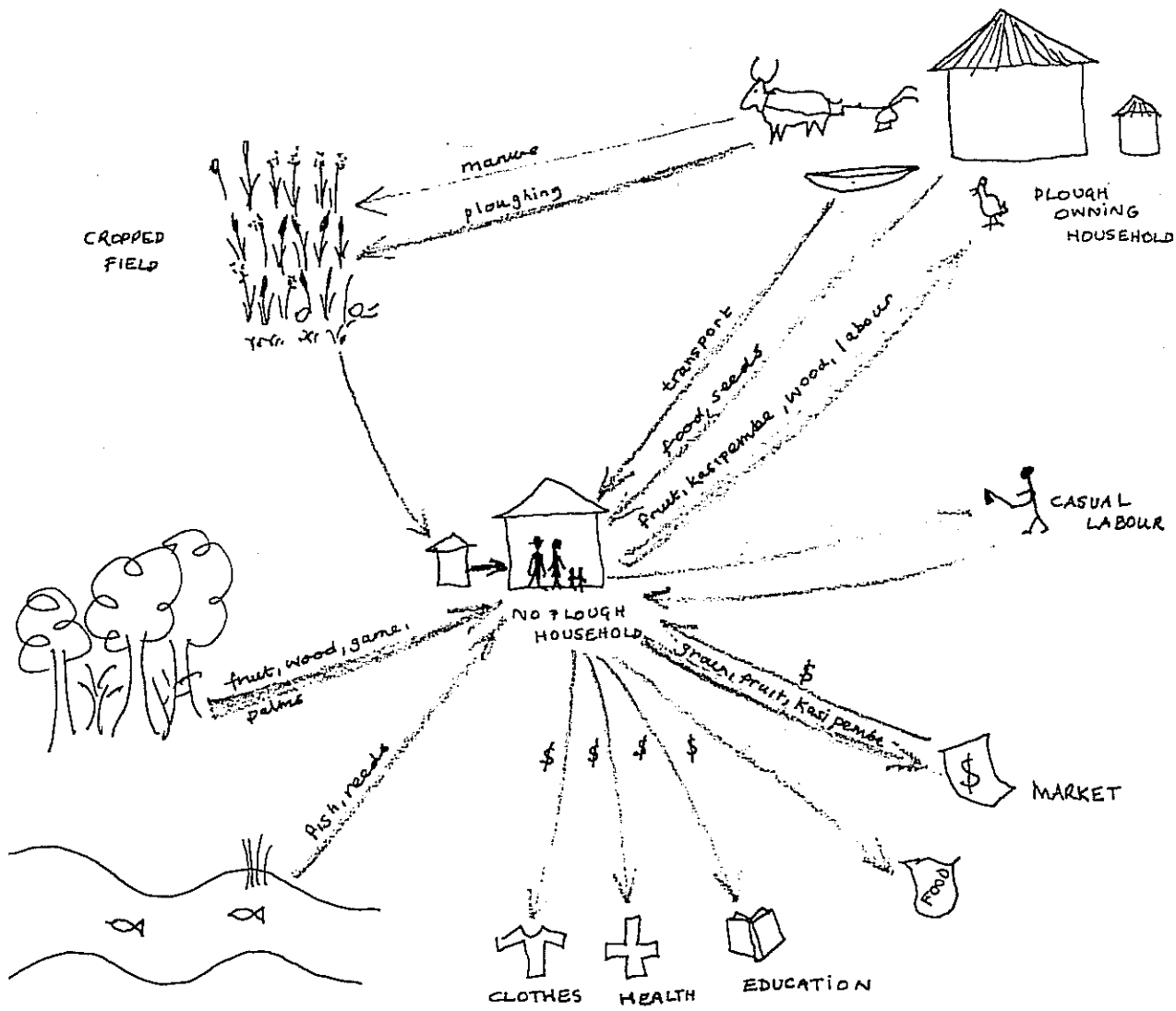
Millet stalks are used for fencing. Seed is pounded and used as porridge or beer. Many households had only one variety of millet. There was much interest in obtaining *Okashana* seeds.

FIG 5.



SYSTEM INTERACTIONS
 PLOUGH OWNING HOUSEHOLD
 INLAND VILLAGE

FIG 6.



SYSTEMS INTERACTIONS
NO PLOUGH HOUSEHOLD
INLAND VILLAGE

SORGHUM

Varieties

Tombo (brown), *Kotovara* (red, short, drought resistant), *Mushiragongombe*, *Kwandumba*, *Nkutji* (white, tall, lodging problems), *Tjatama* (brown), *Mbete*, *Kaumbe*.

Sorghum is used for porridge and beer. Stems can be used for building material, cattle fodder and for eating. (*tombo* & *kotovara*). *Kotovara* and *Mushiragongombe* seeds are no longer available/becoming scarce in the village. Farmers are interested in obtaining seed of the *Kuyuma* variety from Mashare college.

Sorghum Ranking (Community Meeting)

	Tombo	Kotovara	Mushiragongombe	Kwandumba	Nkutji	Tjatama
Porridge		3	3	3	3	3
Drinks	3					3
Building material			3	3	3	3
Edible stem	3	2				

MAIZE

Varieties

Meho ga ndimba (mixture of seed colours on the cob)
 White & Red from Mbunya mission (2 households only)
 Yellow
 White
Lila (1 household only)

Maize is eaten green and dry. It is cooked as grain or pounded. Loss of traditional maize varieties was mentioned as a problem. Most maize failed this season.

LEGUMES

COWPEAS

Varieties:

Ngwayi (white, big seeds, easily dehulled)
 Black
 Small seed - '*dutomani*' from Mbunya (early maturity)
 Red beans (early maturing from Mbunya)
Munene (grey - 1 farmer only)

Leaves are eaten and are an important source of food during the hungry pre harvest period. Seeds are eaten green or dry and are an important relish.

BAMBARA NUT

Varieties:-

White,
black,
red (1 household only)

Are eaten green or dry.

Some households had no access to bambara nut seeds for planting. Some bambara nuts failed this year due to low and irregular rainfall. Losses, from termites in the field and to storage pests are high.

GROUNDNUT

Varieties:-

Nyatama
Mandongondongo

Grown by few farmers. Some told us that they have lost their seed. Problems with termites destroying seeds. Planted separately from other crops because the roots spread.

CUCURBITS (matanga)

PUMPKINS (maliangwa)

One variety only.

Matures later than squash. Leaves can be eaten.

Can be stored for more than 3 months.

SQUASH (rupotera)

One variety only.

Can be eaten green, and is a very important food before the other crops are ready to harvest. Dried squashes can be used as calabashes. Leaves can be eaten when young.

MELON (musoko)

Varieties:-

Musurukwe
Mwengere (green)
Kansengena (red)
Matipi (grey)

Matures later than squash, though leaves can be eaten during hungry period. Can be stored for up to 3 months, depending on the variety. Seeds are spread through cattle manure.

WATER MELON (katchama)

White (traditional)

Red

Can't be stored.

OTHER CROPS

CASTOR

One variety only (big black and white seed). Used to have more varieties in the past. It has become less popular and is now used mainly by older people. Has medicinal properties.

CASSAVA (MUDIKA)

Some farmers interviewed had tried to grow cassava which they had obtained from river communities, and had failed. They attributed the failure to colder weather inland than at the river.

MUTETE

This wild vegetable is an important food source throughout the rainy season. It can also be dried and stored for later consumption. Two types of mutete were mentioned:-

Blue (from Angola)

Red (Mbunya)

5.3 CROP MANAGEMENT PRACTICES

LAND CLEARING

Carried out from July to October by both men and women. Trees and shrubs are cut with axes, heaped and burnt. Grasses are burnt. Larger trees are initially be left in the field and will be cut, or burnt in later years. *Nzambi* system can be used if the family does not have enough labour.

There is a tendency now to clear fields further inland from the village if possible. Those who already have inland fields may enlarge their fields each year. Black soil, in the *omuramba* is preferred but some sandy soil can also be fertile for a number of years. Sandy soils are generally fallowed for 3 - 4 years after 3 - 4 years cropping. Black soils can be cultivated for 7 years before fallowing for 1 year. Weed problems (*esusu* on sandy soil and *ngwena* on black soil) are also a reason for fallowing. Non plough owners who do not have transport and labour to cultivate far inland from the village, have access to low fertility land only (has been cleared and cultivated for many years by the first settlers).

Poor soil fertility was identified by the community as an important problem. Causes were felt to be:-

1. No plough households are using old land as they have no transport to move inland.
2. Trees are being removed because of birds and shading the crop
3. Lack of knowledge of soil conservation especially for sloping land.
4. Low effective rainfall
5. Weed competition

Strategies currently used to prevent this problem are:

1. Plant residues burnt or ploughed into the land
2. Applying manure (by very few cattle owners)
3. Fallowing.
4. Intercropping

LAND PREPARATION

Ploughing and planting begins in November and continues until mid February, depending on rainfall. Land preparation is carried out by plough and by hand hoe. Ploughing begins after the first rain while hand preparation can start before the commencement of rain. Farmers wait till after the rain to plough because the soil is too hard for their oxen when dry (especially black soil). Animal condition may also be a factor. Draft oxen are fed with the leaves of *mbunze*, *muhusi*, *murere* and *mupandu* before ploughing to improve their condition. Sandy soil will be cultivated first as black soil needs more rain before it becomes workable. Ploughing is carried out with 2 - 4 oxen. Ploughing is carried out along the contour on poor soils to reduce water flow and soil lost.

No plough households gain access to ploughs through holding *nzambis* for land preparation (there is no commercial plough hire service and the government tractor ploughing service does not reach this community). Their land preparation will be carried out later as they wait for plough owners to finish their own land. This is a major reason why these households cultivate smaller areas than the plough owning households.

Ploughing is mainly carried out by men and boys. It was mentioned that plough costs are rising (increase from \$250 to \$350 in the last year). Spare parts are purchased in Rundu. Some repairs are carried out locally.

PLANTING

Women household members (mainly the older women in the house) are those responsible for seed selection and storage. These women are the most knowledgeable community members on crop production matters.

Cucurbits may be planted before ploughing, in mid November. Plough operators will then plough around the young cucurbit plants. Alternatively cucurbits may be broadcast before ploughing and will be buried by the plough. Other crops are planted after ploughing.

Millet, sorghum and cowpeas are intercropped with cucurbits and sometimes with bambara nuts. Red sorghums (and early maturing varieties) may be planted separately, particularly on larger farms. Groundnuts are always planted separately from the rest of the crop, because of root interference. Maize is usually planted separately from millet but still intercropped with cucurbits and legumes. Castor grows mainly around the homestead. Mutete grows in the field with other crops or around the homestead.

Maize can be planted behind the plough. Other cereals are broadcast/shallow planted, and legumes and cucurbits are planted in small hills through the fields.

More detailed information on planting will be collected by the project team when they observe these operations in the coming season.

Planting is mainly carried out by women, while men are ploughing.

Many households in the community told us that they had a shortage of seeds to plant this season. A number of the traditional varieties (of sorghum, millet, maize and bambara nuts) appear to have been lost. The causes were discussed in a community meeting and were agreed to be:-

1. Low yield, caused by
 - lack of knowledge of the best time to cultivate and plant

- the rain comes and stops so the seeds burn
- people don't take enough care of crops
- weed control
- lack of equipment for cultivation and weeding.
- no money to hire people for weeding.

2. Storage Losses

- people need money so sell seed
- men exchange seed for drink
- seed is eaten during hungry periods
- storage pests e.g mice and weevils (see discussion on storage)

Strategies to prevent loss of seed are:-

- storage in bottles or underground
- winnowing affected seed.
- hide seed or give it to parents to look after (to prevent it being eaten)
- keeping cats to kill mice [we didn't see any cats however - this may be a future strategy]

There are two older women in the community who store many seed varieties, and who sometimes give seed to households who have lost their own.

The Mbunya mission appeared to be an important source of new seed varieties for people in this area.

WEED CONTROL

Weeding is carried out by hand, using hoes. Men and women both carry out weeding. Children can also help out after school hours. There can be up to three weedings in a season (depending on rain). *Nzambi* can be used by those who have insufficient labour (and casual labour, though this is less common in Mbora than in the river communities). Ploughing is a method of reducing weeds.

The main problem weeds are *ngwena* (cyperus), *esusu*, *muncasira*, *nonhoho*, *muputwi* and *kandjata*.

Mainly sandy soil: - *kandjata* and *esusu*

Mainly loamy soil :- *ngwena*, *ncasira*

FIELD PESTS & DISEASES

Pest	Damage
Mice (<i>nompuku</i>)	Crops at seedling stage, cowpeas and beans at fruiting, bambara nuts and groundnuts at pegging, squash seed in store.
Termites & Ants (<i>nonzegedi</i>)	Seeds in the ground, groundnuts and bambara nuts (one farmer estimated 30 % of her bambara nuts were lost in field through termite damage)
Caterpillars (<i>egundu</i>)	All crops (leaves)
Armoured cricket (<i>kapumba</i>)	Millet and sorghum grain at the milk stage
Polecat (<i>kangamba</i>)	Maize at germination, bambara and groundnuts at germination and pegging

Pigeon & quelea	Millet seed on head, maize at germination, sorghum mature seeds
Guinea fowl (<i>nkanga</i>)	Maize at germination
Monkey (<i>nsima</i>)	Mature crops
Porcupine (<i>siningu</i>)	Cucurbits and legumes (near maturity)
Weevils	All crops in store (millet less effected)
Stemborer	Cereals at flowering
Shoot fly	Early tillering
Aphids	Cowpea & melons
Humans	Steal mature crops. The cause of crop theft was felt to be ill health, drunkenness, laziness.
Livestock	Uncontrolled livestock can cause considerable damage to growing crops

Smut on sorghum and millet heads is the only disease mentioned.
 These pests and diseases should be investigated in more detail during the growing season.

Pests are controlled by a number of methods:-

'Ruvare' magic is used to prevent thieves stealing from fields. Thieves who are caught are taken to the traditional court.

Pests such as crickets are fed to chickens.

Birds are scared by placing plastic bags and clothes in the field and by making fire (using green leaves to produce smoke) or noise in the field.

Fencing fields is a strategy (practiced by few farmers only) to prevent livestock damage. Livestock are also herded during the growing season.

Wild animals are trapped or scared.

Planting larger fields to minimise losses.

HARVESTING

Harvesting of the main crops is carried out from June to mid August by men and women. Green maize may be harvested from March/April. Squash can be eaten green from February. Pumpkin leaves are eaten from January. The small pumpkins and melons can also be eaten from January. Cowpea leaves can be eaten after fruiting, from February. Mutete becomes available soon after the first rains.

PROCESSING AND STORAGE.

Grain storage is carried out in sacks (sometimes buried under the ground), in gourds and in bottles (especially for seed). Seed for planting is sometimes kept unthreshed in a sack. Storage losses from weevils are high. Millet appears to be more resistant than other crops to weevils. One strategy to reduce storage losses is to mix legume, maize and sorghum seeds together with millet. Bambara and ground nuts may be stored in their shells for additional protection.

Estimates of storage losses (of seed quality grain) (by two women interviewed) were:-

- maize - 30%
- groundnuts - 50-%
- bambara nuts - 50%
- cowpea - 60 - 75%

We observed no use of chemicals or other indigenous materials to protect seeds in store.

5.4 LIVESTOCK

CHICKEN

Local breed only. Chickens are allowed to range freely around the homestead. Some households have chicken houses for keeping the animals at night. Chickens, but not eggs, are sold or exchanged.

Chickens are mainly owned by plough owning households. Of the no plough households interviewed (8), only 3 owned chicken, and then only 2 -3 in number.

There are virtually no inputs for chicken production. The veterinary assistants do not deal with chickens or sell drugs for chicken diseases. Chicken diseases were identified to be a major problem in a group meeting. The main diseases are:-

Disease	Treatment
Lung disease (kapunga)	Use usivi leaves in water to treat this (we were told this is not very effective)
Katjiyo (haemorrhage)	Chicken is cut above its tail.
Lice (mburundu, yindyandu)	Roots of maputwi and tobacco tar are used around the eyes.
Swelling eyes (kapaka)	

Chicken are kept free range to avoid rapid spread of diseases.

The farmers we interviewed were not aware of drugs which can be used to treat these diseases, or where they might be found.

The cost of a chicken in this area is approximately 5 - 10\$ *wide difference*

PIGS

Pigs came quite low in the community enterprise ranking. We were told this was because they eat too much and are in direct competition with humans for their food. Only one family in the village keeps pigs at the moment. Some farmers told us they had had pigs in the past but had killed them because food was short.

The pigs can be sold locally.

GOATS

Local breed only. Villagers told us that goats are bought only after the farmers have managed to acquire cattle. This was supported by our own observations:- of those interviewed (23) 1 non plough owner and 7 plough owners owned goats, compared to 1 non plough owner and 13 plough owners who own cattle. However, villagers told us that the number of goats in the community are increasing. Female goats can be expected two kids at each birth.

Goats are herded together with cattle. Goats are not treated by the visiting veterinary assistant. Sale is local. One cow can be exchanged for six goats.

Villagers are interested in improved breeds of goats (Boer goats).

CATTLE

Local breed only.

People had more cattle in the past (better grazing was a reason given by many households for moving to Mbora). However many cattle were lost from lung disease from 1986 - 1993 due to unvaccinated Angolan cattle coming across the border. Today numbers are increasing again. We did not collect information on livestock numbers owned by individual households, but villagers estimated that there are between 800 and 1000 livestock in Mbora at present (and 15 households own cattle). Ownership is mainly by men, though anyone in the family can own cattle. Sale of cattle is controlled by the household heads.

Male calves are castrated. One bull is kept in each herd. The herd composition is usually: one bull, cows and oxen. Castrated males will be sold, once draught animal requirements have been met.

Criteria for cattle selection given were:

Bulls: size and colour (light brown, red, black are the best)

Cows: milk, calving, drought resistance, disease resistance

A cow can be kept for 10 years or more if still productive.

Oxen play an important role in providing power for land preparation, and for transport (pulling sledges and canoes) through the year. Ploughing can be carried out with 2 - 4 oxen. 2 - 6 oxen (and sometimes more) are used to pull sledges and canoes. Young boys (and in the past men) also ride oxen. Oxen grazing on the unfenced cropped land during the winter and spring add some manure to these fields. Kraal manure is however seldom used. People told us that transport to the field was a problem. Others were frightened that the manure would burn the crop.

Milk produced by cows is an important source of food (for livestock and non livestock owners), particularly in the hungry summer season (see fig 3. food calendar)

Veterinary services:-

A veterinary assistant visits the village once a month to record livestock numbers. Vaccinations are carried out once a year for lung sickness and foot and mouth disease. The villagers indicated that they would like more advice and services from the vets.

Marketing is local, or through Meatco in Rundu. A signed note (stating proof of ownership) from the headman is required in order to sell cattle. $\frac{1}{10}$ of each?

5.5 GRAZING MANAGEMENT

Livestock are herded during the cropping season. Grazing seems to plentiful in this area and there is no apparent management pattern over the season. Animals are kept near the village, grazing freely during the winter. Access to grazing land is open to any herder. However the land South of the village up to Pusa (>10km) is used mainly by the Mbora community alone.

Important grass species include:-

Erarampi, engofu, singandu, ngwena and *esusu*. *Erarampi* is the best for cattle. *Ngwena* and *esusu* are important crop weeds (grazing during fallow is used to control this weed, the weeds can also be spread through kraal manure).

Important shrubs include:

Mbunze, muhusi (used in winter season)

Important trees include:-

Murere (when young), *mupanda, mupupu*. *Mupanda* is fed to sick cows. See Appendix 3 for botanical names.

In group discussion, villagers expressed concern about forest fire which is affecting fodder trees and shrubs. (see discussion of forest management in next section)

There is a problem of cattle getting lost when they are grazing alone far from the village.

5.6 FOREST PRODUCTS

WILD FRUIT

19 wild fruit trees were mentioned by villagers in Mbora (see appendix 3 for full list). Uses include food, oil, alcohol production, medicine, woodcarving, building materials and tool production. The most important are:-

- | | |
|------|--|
| No 1 | <i>Nongongo</i> (mangetti)
<i>Nonsimba</i>
<i>Nonsivi</i>
(all can be stored for more than 1 year.) |
| No 2 | <i>Maguni</i>
<i>Matu</i> |
| No 3 | <i>Makopa</i>
<i>Nompundu</i> |
| No 4 | <i>Nonzwe</i> |

Management Notes:-

Nonsimba trees give a good harvest every 3 years (sometimes a sign of a drought year). Its yield can be increased by cutting branches.

Makweyo - good yield is a sign that the crop yield will be good.

Mangetti - 1.5 x 50kg bag per tree (1 x 50kg bag can produce 10 litres of *kasipembe*). 5 litres can be produced in one day (5.30 am - 12.00)

Maguni - more than 2 x 50kg bag per tree (1 bag can produce 15 - 25 litres of *kasipembe*)

Livestock can eat *nongongo, maguni* and *nonsivi* fruit.

Nonzwe and *nongongo* can be used to produce oil.

Only fruit trees in crop fields can be protected from other people using them. Access to wild fruit is free to all. People from the river communities will sometimes come into this area for a few days to collect fruit.

Trees in crop fields are used by children. Adults (mainly men) collect fruit from the forest. When land is first cleared some fruit trees, especially *nongongo* and *maguni* can be left on the field. However they too will be cleared with time.

Most wild fruit trees are located to the South of the village. Forest fire harms fruit trees. *Nonsansi*, in particular is becoming scarce. There is no planting of wild fruit trees in this village.

OTHER USEFUL TREES

Uhahe - important for carving, building and firewood

Mupanda - medicinal, good shade tree, building yoke.

Mugoro - good for building and rope making.

See Appendix 3 for botanical names.

GAME & OTHER PRODUCE

Some small antelopes and other small game are still available in the forest inland of the village. However numbers are decreasing. Burning grass for hunting (usually by outsiders) is a major cause of forest fires.

Honey is also becoming scarce (bushmen are the experts in honey collection).

More information needs to be collected on wild vegetable/root species.

FOREST MANAGEMENT

Access to the forest and forest products is free to all. Trees can be cleared to prepare agricultural land, but people must officially have permission to cut trees for timber. Forest fire was identified by the villagers as a major problem, effecting the availability of fruit trees, shrubs and trees for livestock, wild animals, honey and harming the soil. In a group discussion the main causes were felt to be:-

1. Small fires lit by people who are staying in the forest which are not properly put out (this was thought to be mainly caused by bad luck rather than negligence).
2. People dropping cigarette ends in the forest (mainly outsiders who don't realise the danger).
3. Hunters burning the bush (lack of thought for the future).
4. Burning agricultural fields without clearing properly around the edges.

Existing strategies to prevent/reduce forest fires are:-

1. Clearing fields properly before burning
2. Roads prevent the spread of fire
3. Punishment for those who are caught burning. The headman has the right to punish any forest burners or to take them to the tribal court. However the burners are seldom identified.

5.7 OTHER ENTERPRISES

CASUAL LABOUR

Both men and women carry out casual labour. This work includes agricultural labour, fetching water, building roofs, herding, collecting mangetti nuts. Paid labour exchange within this community seems to be much less common than in the river communities. The school teachers are important cash employers in the community. Some of these activities (especially those carried out in the village

may be repaid by other services or by food e.g ploughing, millet etc). The two bushmen families are attached and working to Mbunza families.

MANGETTI AND *KASIPEMBE* SALE AND EXCHANGE

Mangetti nuts are collected and are sold and consumed as fruit, *kasipembe* alcohol and as nuts. Most families have facilities for distilling *kasipembe*. *Kasipembe* is provided by no plough households to plough owning households in exchange for ploughing services, food, transport etc. *Kasipembe* and mangetti fruit and nuts are also sold or exchanged with people from the river communities. The nuts which can be stored for over a year, are an important source of food during the hungry summer period.

This enterprise is particularly important to no plough households. The no plough household, which carried out an income, expenditure ranking with the team, ranked mangetti as the number one income generating enterprise. *Kasipembe* was also ranked as a no. 1 enterprise in the community ranking.

BASKET MAKING

Baskets are made by women from the *muce* tree (roots). They were ranked high by women in the community enterprise ranking because they are vital to many other enterprises (used for carrying, threshing, winnowing etc).

BLACKSMITHING

There are four blacksmiths in the community. They produce hoes, knives, bows and arrows and carry plough repairs and sharpen plough shares. Tools are sold locally and at Rundu, particularly on pay days.

CARPENTRY/WOODCARVING

There are two expert woodcarvers in the community. Woodcarvers produce doors, tables, chairs, canoes, drums and tool handles.

There are problems of marketing and of getting permission to cut wood. There is competition between Mbunza people and bushmen who are very expert at wood carving.

FORMAL EMPLOYMENT

3 of the 23 households interviewed had an employed household head (teachers). Others had family members away working. Formal employment, or remittances from absent family members, is a key factor in obtaining ploughs and livestock.

FISHING

Most families are involved in fishing for family consumption. Fish are an important source of protein during the hungry period. People from inland communities have free access to fishing, just as river community dwellers have free access to fruits inland.

6. SYSTEM INTERACTIONS

(See diagrams for plough owning and no plough household Figs 5 & 6)

POSITIVE

Cattle provide milk which is important for food security in the hungry summer months. Livestock provide a source of savings, investment and food.

Livestock manure fields (of all farmers) while grazing residues.
 Livestock used for ploughing and transport.
 Manure applied to fields around house (few farmers) improves fertility.
 Grazing fallow controls *esusu* and *ngwena* weeds
 Ploughing, food and other services exchanged for wild fruit products.
 Intercropping - improves soil fertility.
 Squash, pumpkin leaves and cowpea leaves are important for food security in the hungry months.
 Millet stovers used for fencing and roofing
 Forest trees provide fodder to maintain condition of draft animals during the dry season.
 Trees left in the field improve fertility and reduces soil erosion.
 Wild fruit and vegetables provide an important source of food in the hungry months particularly for poorer households.
 Pension, local employment and remittances from absent household members supports rural families & pays school fees & allows investment in agriculture (e.g ploughs and livestock)
 Canoe can be used both on river and on land for transport.

NEGATIVE

Drought, hunger and alcoholism are causing planting seeds to be lost.
 Fire destroys wild fruit and grazing.
 Trees left in field harbour birds & compete with crops for sunlight and moisture.
 Removal of trees from the field increases soil degradation
 Hunters start forest fires
 Wild animals destroy crops in the field.
 Cattle destroy crops when not herded properly
 Manure brings *esusu* and *ngwena* seeds to the field, and burns crops because its not prepared properly.
 Absence of parents for migrant labour places heavy workload on grandparents.

7. STRENGTHS AND WEAKNESS

The following 'forcefield analysis' of positive and negative factors in the community was carried out by the research team after completing the individual household interviews. It was presented to the village in the final meeting for confirmation.

Positive

Borehole
 School in the community
 Some community members are storing indigenous seeds
 Blacksmiths and woodworkers in the village
 Plentiful land
 Plentiful grazing
 Health committee and health workers
 Regular visits from veterinary services
Nzambi system
 Plough/labour exchange

Negative

Drought and irregular rainfall
 Uncontrolled fires destroying fruit and grazing
 Loss of traditional crop varieties:- maize, sorghum, banbara, groundnuts, cowpeas, millet.
 No clinic
 Cattle diseases - not all vaccinated
 Low fertility of soil
 Not all households are able to go far inland to farm fertile soils
 Manure not used
 Lack of transport
 No advice from extension
 Crop pests and diseases.

Sandy soils are easy to cultivate and plant early Storage pests
Omuramba (dry river bed soils) keep fertility Weeds like *esusu*, *ngwena*, *muputwi*
 for a long time.
 Many ploughs in the village. Most people have No shop
 access.
 Lots of manure available. No available sources of seed
 Vegetable gardening beginning Chicken diseases
 No root crops

GENDER ANALYSIS OF STRENGTHS AND WEAKNESSES

The research team examined constraints and weaknesses as they effected different household members. This will help the team in identifying suitable partners in the community for collaborative research activities.

Who	Strengths	Weaknesses/ Problems	Practical Needs	Strategic Needs (for empowerment)
Young Women	Knowledge of crops and wild fruits. Involved in many enterprises. <i>Nzambi</i> system.	Time. Malaria. Children's illnesses. Lack of control over livestock and crop sales. Alcoholism in family.	Labour saving devices. Water transport. Weeding. Improved field and storage pest control. Reliable source of seed. Improved soil fertility. Better health care information. Clinic.	More control over household resources and in village organisations.
Young Men	Physical strength. Outside experiences. Control of core family unit.	Alcohol. Absence from village for employment. Problems generating capital. Lack of men's organisations.	Local employment. Income sources/ credit to buy ploughs.	Men's group.
Older Women	Knowledge of crops & wild fruit.	Physically weak. High workloads if responsible for grandchildren with parents absent. Lack of respect for traditional knowledge from younger people.	As for women especially labour saving devices.	Representation on village committees. More support from absent children. Raise awareness of younger generation on importance of forest products.

Older Men	Knowledge and experience. Respect and control.	Physically weak. Lack of respect for traditional knowledge from younger people. Too much responsibility		More support from absent children. Raise awareness of younger generation on importance of forest products.
Boys	Education. Income from nuts, chicken and fish.	Poor study facilities at home. Family have problems paying school fees.	Better equipped school. Support for poorer families with school fees.	
Girls	Education. Income from chicken.	Poor study facilities. Lack of school fees. Teenage pregnancies.	Education on birth control for boys and girls.	Boys to share responsibility for birth control.
Household heads	Control of household and community affairs.	High level of responsibility	Improved control of livestock diseases	Support groups (especially for women household heads).

PROBLEM RANKING BY COMMUNITY

The problems and root causes are discussed in more depth in the relevant sections of this report. The problems were ranked by farmers in a community meeting as follows:-

No. 1

***Theft *Forest fire *Sickness (lack of clinic)**
 Transport, Livestock disease (chicken & cattle), Lack of shop, Low rainfall, Crop pests, Weeds, Storage pests, No reliable source of seeds.

No. 2

*** Lack of extension advice**
 Loss of local seeds - millet and sorghum, Manure is not used, Not all farmers can go inland

No. 3

Loss of local maize and legume seeds, Low soil fertility.

*Most important in each group.

8. CONSTRAINTS AND OPPORTUNITIES

Constraints and opportunities for actions for some of the main problems identified, were discussed in a community meeting with farmers. Further discussions were held by the research team alone. Due to time limitations we were not able to discuss all of the constraints identified by farmers and researchers. We plan to hold further discussions on these issues at a later stage.

8.1 LOSS OF SEEDS/NO RELIABLE SUPPLY

Future Action - Farmers Ideas

Local shop for tools and seeds

Extension officers should sell subsidised seed in the community

Use of pesticides for storage pests [research team recommend natural only]

Reliable farmers to store seeds

Limit alcohol use in the village

Researcher ideas

Planting date - comparison of management strategies and implications for yield and food security.

Look at alternative management strategies who get access to ploughs late.

Tools or strategies for early land preparation and planting.

Post harvest ploughing

Test alternative crop varieties (for improved yield and food security). Farmers are particularly interested in Okashana millet and Kuyuma sorghum varieties.

Natural pest control measures for storage pests - explore ideas

Storage structures - explore ideas

Collection, bulking and storage of traditional seed varieties

Involve farmers in seed multiplication activities

Who should implement?
(together with KFSRT)

*future focus studies for
KFSRT

Canamco/community
Extension

Crops Research

Community supported by
Crops Research/extension
Community

Crops Research*

Crops Research & ITK

Crops Research & ITK

Crops Research & DAP

Crops Research & Canamco

ITK, Crops Research and
Specialists

ITK, Extension, Appropriate
Technology Centre.

Crops Research (herbarium)

Crops Research, Extension

8.2 CHICKEN DISEASES

Future Action - Farmers Ideas

Vet should come and examine chickens and should advise on chicken diseases

Information on NBC about chicken diseases and treatment.

Research Team Ideas

Monitor chicken illnesses

Training groups

Vet assistant to carry medicine for chickens

Chicken vaccination

Joint planning with livestock researchers and vet.

Veterinary services

Vet services/NBC

Community & KFSRT

Vet & Extension

Vet

Vet & community

Vet & Livestock Research

Train paravets at the community level

Vet

8.3 POOR SOIL FERTILITY

Future Action - Farmer Ideas

Access to manure for non plough owners

Use of manure

Fertiliser

Community
Crops Research & Community
Extension (but not
recommended by KFSRT for
these soils)
Crops Research

Interested in different ways of applying manure

Research Team Ideas

Plant acacia albida which loses its leaves in summer, in fields.

Forestry research may know other similar species.

Keep existing tree species - pollarding during growing season?

Forestry research

Explore ways of transporting manure e.g panniers, wheel barrows etc. *What's wrong with sledges?*

Forestry research

Rotating kraal in field /keep cattles in fenced fields?

DAP & ITK

Improved fallow (plant legumes e.g sesbania)

Crop rotations

Legume spacing?

Zero ploughing

Mulch

Low growing legumes

Soil mulch through shallow weeding?

Grass strips on slopes

Trash lines

Leaving furrow when ploughing to reduce runoff

Community
Crop & Forestry research
Crops Research
Crops Research
Crops Research
Crops Research
Crops Research
Crops Research & Specialist
Crops Research
Crops Research

8.4 CROP PESTS

Future Action - Farmer Ideas

Chemical control [because of health and cash issues, KFSRT would prefer to explore natural pesticides]

Investigate millet and sorghum varieties resistant to birds

Research Team Ideas

Use tins, stones and strings to make bird scaring device like the Mashare one.

Millet & Sorghum varieties resistant to birds e.g compact heads and bristles

Collect samples and carry out monitoring to understand problems better

Natural pest control methods

Crops Research

Extension

Crops Research

*Crops Research

Crops Research & ITK &
Specialists
Crops Research
DAP

Improved soil fertility

Test tools for faster, easier weeding (hand and animal drawn), collaborative design with local blacksmiths and carpenters.

Identify local blacksmiths and carpenters. Look at production possibilities *DAP

8.5 FOREST FIRE

Future Action - Farmer Ideas

Consult the department of Forestry to put fire breaks in. Community & Forestry Department
Community

Try to clear before burning fields. Penalty for those who don't clear.

Education at school about the importance of the forest
Information about fire hazards to be broadcast on the NBC Forestry, Canamco & schools
Forestry & NBC

Research Team Ideas

Fire warning signs put up by forestry department Forestry
Controlled grazing of vulnerable areas to reduce fire risk Community
Replanting and rehabilitation of burnt areas Forestry, Forestry research, school & community
School projects on forest products Agricultural training, schools.

8.6 TRANSPORT (we did not have time to discuss this in the community meeting, but the research team discussed some ideas in their final meeting) (see Infrastructure section for discussion of problem and causes)

Research Team Ideas

Panniers DAP
Carts DAP
Collaborative work with local artisans DAP & ITK
Human yoke DAP & ITK
Horses and donkeys could carry people DAP & ITK

DAP - Training Draft Animal Power Programme

ITK - Indigenous technical knowledge (farmers own initiatives)

Two other important issues which do not fall under the project's mandate are:-

Control of livestock access across the river (to Policy requirement
reduce spread of lung disease)

Clinic Health Department

9. FUTURE ACTION AND FURTHER INFORMATION NEEDS

Following this preliminary community survey, the KFSRT plans to initiate collaborative research activities with a group of farmers in Mbora community. Working together with MAWRD researchers and extensionists, we plan to identify and offer a number of technologies or management recommendations which we believe could help farmers overcome some of the constraints to production which they have identified. This 'basket of options' will be generated from past on station research results, from innovative practices observed in Kavango itself and from farmers practices or successful adaptive research in other areas. The technologies will then be screened by a group of farmers, who will select which they feel might be appropriate for their own farming systems. These

technologies will be tested by farmers, under their own farming conditions (with parallel trials on station) over the next year.

Further Information Needed.

Discussions on main constraints which we didn't cover in this survey e.g cattle diseases.

Soil samples

Identify botanical names of problem weeds. Assess impact on crop production.

Samples of fruit trees which could not be identified from the CANAMCO data base.

Pest and diseases - monitor impact on crop production.

Further focus studies on forestry (this survey covered fruit and fodder species only)

More information needs to be collected on wild vegetable/root species.

Rainfall data.

APPENDIX 1
SURVEY PROGRAMME

Monday 17th	Meet at Ag. Extension Offices 2pm Proceed to Levi Hakusembe school 3pm - 5pm Introductions, background to area, discussion of research methods to be used.
Tuesday 18th	Community meeting - mapping, calenders, resource management matrix etc.
Wednesday 19th - Friday 21st	Individual interviews - farm profiles
Monday 24th	Research team - analysis of farm profiles: most important enterprises, system interactions etc.
Tuesday 25th	Community Meeting - rank priority enterprises with community. Decide which on enterprises should be selected for in depth analysis.
Wednesday 26th - Thursday 27th	In depth analysis of key enterprises using focus group discussions and individual interviews.
Friday 28th	Community meeting. Forcefield Analysis, Problem ranking, Problem and solution trees.
Monday July 31st	Research team: final discussions: opportunities and research, extension and training issues.

APPENDIX 2

FARM PROFILE - MBORA

Date:-

Facilitators:-

Household members interviewed:-

HOUSEHOLD AND FARM DESCRIPTION (see also map)

HISTORY

ENTERPRISES

Crops

Livestock

Other Enterprises

SYSTEM INTERACTIONS

TRENDS

OTHER NOTES

APPENDIX 3

WILD FRUIT SPECIES COMMONLY USED IN MBORA VILLAGE

Local Name	Botanical Name
Nongongo (mangetti)	Ricinodendron rautaneii
Nonsimba	Dialium Engleranum Henriq
Nonsivi	Guibourtia Coleosperma
Maguni	Stychnos Cocculoides Baker
Matu	Stychnos pungens
Makopa	Grewia avellana Hiern
Nompundu	Grewia retenervis
Nomaka	Flarescens
Makwewo	Diospyros chamaethamnus
Maroro	Annona stenophylla
Nonkekete	Ziciphus mucronata
Muyimbo	Rhynchosia sublobata
Mukuku	Rus tenuinervis
Nombumbu	Vangueria esculenta
Rukombo	?
Echava	?
Nompeke	Ximenia caffra
Nonsansi	Parinari capensis
Nonzwe	Ochna pulchra

Other Useful Trees Identified

Uhahe	Zambezi teak	carving, building, firewood.
Mupanda	Lonchocarpus nelsii	fodder
Mugoro	Terminalia sericea	building, rope making
Murere	Diplorynchys condylocarpon	fodder
Mupupu	Combretum collenum	fodder
Muce	?	basket making

