REPUBLIC OF NAMIBIA

MINISTRY OF AGRICULTURE, WATER AND RURAL DEVELOPMENT

FARM-HOUSEHOLD ECONOMICS SURVEY OF THE CAPRIVI REGION NAMIBIA

ANALYSIS REPORT 1

September 1996 to June 1997

DIRECTORATE OF PLANNING
WINDHOEK
March 1999

Farm-Household Economics Survey of the Caprivi Region Namibia

September 1996 to June 1997

ANALYSIS REPORT I

Directorate of Planning
Ministry of Agriculture, Water and Rural Development

Windhoek
March 1999

Table of Contents

INTRODUCTION 1

1. ACKNOWLEDGMENTS 1
2. CONTEXT AND PURPOSE OF THE FARM-HOUSEHOLD ECONOMICS SURVEY 1
3. ORGANISATION OF THE REPORT 2
4. DESCRIPTION OF THE SURVEY 2
5. DATA ANALYSIS PROBLEMS 4
6. DEFINITIONS 4

PART A VILLAGE AND HOUSEHOLD CHARACTERISTICS 6

A 1 VILLAGE CHARACTERISTICS 6
A 1.1 Village Locations 6
A 1.2 Rainfall 7
A 1.3 Pests 10
A 1.4 Field Characteristics 10
A 2 HOUSEHOLD CHARACTERISTICS 11
A 2.1 Household Composition and Workforce 11
A 2.2 Employment of Household Members 13
A 2.3 Age of Household Members and Dependency Ratios 14
A 2.4 Ownership of Assets 15
A 2.5 AVERAGE SESSION LENGTHS AND REGULAR ACTIVITIES 16

PART B HOUSEHOLD NON-CROP WELFARE STATUS 18

B 1 CASH INCOME AND EXPENDITURE 18
B 1.1 Seasonal Income and Expenditure 18
B 1.2 Detailed Income and Expenditure 20
B 1.3 Distribution of Income and Expenditure 21
B 2 OWN CONSUMPTION OF LIVESTOCK PRODUCTS 23
B 2.1 Consumption of Own Cattle Products (milk excluded) 23
B 2.2 Consumption of Own Goat Products 24
B 2.3 Consumption of Own Poultry Products 25
B 2.4 Consumption of Own Milk Products 26
B 2.5 Value of consumption of Own Products 27
B 3 CHANGES IN LIVESTOCK NUMBERS 28
B 3.1 Seasonal Changes in Livestock Numbers 28
B 3.2 Value of Livestock Changes 30
B 4 NON-CROP WELFARE GAINS 32
B 4.1 Non-crop (cash & cattle) Welfare Gain/loss 32

PART C CROP PRODUCTION 33

C 1 CROP AREAS 33
C 2 LABOUR FIELD INPUTS BY HOUSEHOLDS 36
C 2.1 Labour Inputs by Type of Labour 36
C 3 DRAFT POWER AND EQUIPMENT USE FOR LAND PREPARATION 40
C 3.1 Methods of Land Preparation 40
C 3.2 Type and Number of Equipment Used for Oxen Ploughing 41
C 3.3 Ownership of Equipment and Oxen for Ploughing 42
C 4 SEED USE AND SOURCE OF SUPPLY 43
C 4.1 Seed Source 44
C 4.2 Seed Type 44

PART D PER HECTARE CROP INPUTS AND OUTPUT 45

D 1 PERSON SESSIONS PER HECTARE 45
D 2 SEED INPUTS PER HECTARE 46
D 3 YIELD PER HECTARE 46
D 3.1 Estimates of Yield from Farmers 46
D 3.2 Estimates of Yield from Field Off-Take 48
D 3.3 Estimates of Yield from Crop Cutting 48

PART E RELATIONSHIPS BETWEEN HOUSEHOLD CHARACTERISTICS, PRODUCTION CAPACITY AND PERFORMANCE 49

E 1 FACTORS INFLUENCING AREA CROPPED 49
E 2 RELATIONSHIPS BETWEEN CATTLE NUMBERS AND OTHER VARIABLES 49
E 2.1 Cattle and Household Characteristics 49
E 2.2 Cattle and Non-crop Welfare 49
E 2.3 Cattle Ownership and Crop Production 50
E 3 PER HECTARE INPUTS AND OUTPUT BY CATTLE OWNERSHIP 50
E 4 PER HECTARE GRAIN YIELD ESTIMATES BY CATTLE OWNER 51

PART F FARM HOUSEHOLD MODELS. 52

F 1 INTRODUCTION 52
F 2 CALCULATIONS 52
F 3 MODEL I: NO CATTLE OWNED 53
F 4 MODEL II: 1 – 15 HEAD OF CATTLE 55
F 5 MODEL III: MORE THAN 15 HEAD OF CATTLE 56
F 6 CONCLUSION 57
F 6.1 Farm-household productivity indicators 57
F 6.2 Productivity indicator comparisons 58

QUESTIONNAIRES 59

Tables and Charts

Part A Village and Household Characteristics

Map 1.1 Location of the surveyed villages 6
Table A1.1 Village locations and seasonal rainfall 7
Chart A1.2 Rainfall by visit 8
Chart A1.3 Long-term average rainfall 9
Chart A1.4 Field characteristics 11
Chart A2.1 Household composition and workforce 12
Table A2.2 Employment of household members 13
Chart A2.3 Age distribution for each village 14
Chart A2.4 Age distribution for all villages 15
Chart A2.5 Ownership of assets 16
Table A2.6 Average number of hours per session for key activities**Error! Bookmark not defined.**
Table A2.7 Average number of hours per session for regular activities 17

Part B Household Non-crop Welfare Status

Table B1.1 Expenditure/income average over all households (N$ per 2 week period) 19
Chart B1.2 Income and expenditure - average per household (N$ per 2 week period) 19
Table B1.3 Detailed income averages over all households (N$) 20
Table B1.4 Detailed expenditure averages over all households (N$) 20
(Continued) 21
Table B1.5 Cash income and expenditure by village 21
Chart B1.6 Distribution of income from earnings and sales 22
Chart B1.7 Distribution of expenditure on food 22
Chart B1.8 Distribution of net cash balances (excluding income from non-crop products) 23
Chart B2.1 Percentage consumption of cattle by households owning 23
(Continued) 24
Chart B2.2 Percentage consumption of goats by households owning 24
(Continued) 25
Chart B2.3 Percentage consumption of poultry owning households 25
(Continued) 26
Chart B2.4 Percentage consumption of milk for cattle owning households 27
Chart B2.5 Distribution of households by value of consumption of own livestock products 28
Chart B3.1 Cattle changes per 1000 head 29
Chart B3.2 Smallstock changes (per 1000 head) 29
Chart B3.3 Poultry changes per 1000 head 30
Chart B3.4 Distribution of households by value of additions to livestock 31
Chart B3.5 Distribution of households by value of additions to livestock 31
Chart B4.1 Distribution of households by net welfare status. 32

Part C Crop Production

Table C1.1 Cultivated plots by type of crop growing 33
Table C1.2 Percentage of plots by crops growing 34
Table C1.3 Households Growing Major Crops 35
Table C1.4 Total Area in hectares and Proportion of Area under Major Crops 35
Table C1.5 Average Areas in Hectares per Grower of Major Crops 36
Table C2.1 Labour field inputs by type of worker and activity 37
Chart C2.2 Labour inputs to fields by major activities 37
Table C2.3 Labour inputs by activity and worker type 38
(Continued) 39
Chart C2.4 Time spent by different population groupings on field activities 40
Table C3.1 Methods of land preparation 41
Table C3.2 Number of equipment used for oxen ploughing 42
Table C3.3 Ownership of equipment used for ploughing 42
(Continued) 43
Table C3.4 Ownership of draft power used for ploughing 43
Table C4.1 Seed source of supply 44
Table C4.2 Seed type 44

Part D Per Hectare Crop Inputs and Output

Table D1.1 Per hectare labour inputs to crop production 45
Table D2.1 Per hectare seed inputs (kg/ha) 46
Table D3.1 Reasons for plots having zero yield 46
Chart D3.2 Distribution of households by farmer estimates of yields per plot for maize 47
Chart D3.3 Distribution of households by farmer estimates of yields per plot for sorghum 47
Chart D3.4 Distribution of households by farmer estimates of yields per plot for millet 47
Table D3.5 Farmer estimates of yield by Major crop type 48
Table D3.6 Recorded off-takes kg/ha 48

Part E Relationships between Household Characteristics, Production Capacity and Performance

Table E2.1 Household composition by cattle ownership 49
Table E2.2 Household wealth measures by cattle ownership 50
Table E2.3 Main crop production by cattle ownership 50
Table E3.1 Per hectare labour days by cattle ownership 50
Table E3.2 Proportion of sessions supplied by non-household members by cattle ownership 51
Table E4.1 Grain yields – farmer estimates kg/ha 51

Part F Farm Household Models.

Table F3.1 Farm Model Type I - No cattle owned 54
Table F4.1 Farm Model Type II - 1-15 cattle 55
Table F5.1 Farm Model III - Over 15 cattle owned 56
Table F6.1 Farm-household productivity indicators 58
Table F6.2 Productivity indicators 58

Introduction

1. Acknowledgments

The implementation of this survey in 1995 was made possible through a grant of counterpart funds from the European Union. Technical and financial support provided by the European Union initially catalysed the development of the Farm-Household Economics Survey into an established activity of the Directorate of Planning (DoP). The Ministry of Agriculture, Water and Rural Development maintain the survey financially since it was conducted in the Caprivi region over the 1996/97 cropping season. Although the survey is financially independent, guidance is still needed for data analyses and it is provided by the British Overseas Development Administration (ODA).

Here follows a list of the team members involved in the Caprivi survey:

Mr. C. Daffin (Technical Adviser)
Ms S. Loubser (DoP staff member)
Mr. L. Rukoro (DoP staff member)

Field supervisors:

Mr. G. Neumbo (DoP staff member)
Mr. O. Shivute (DoP staff member)
Ms L. Munene

Enumerators:

Mr. F. Chaka
Mr R. Mundia
Mr B. Mate
Mr F. Kakula
Mr I. Matengu
Mr M. Vuyalo

2. Context and Purpose of the Farm-Household Economics Survey

The survey was first conducted in the Okavango region over the 1995/96 cropping season. The survey has evolved since Okavango where it was known as the 'Farm Management Survey' and it is thought that this name no longer reflects the revised content of the survey. Hence, for the Caprivi region the survey has been renamed as the 'Farm-Household Economics Survey'. This report presents findings from a survey carried out in the Caprivi region covering the 1996/97 cropping season. Similar surveys will be carried out in all other Northern Communal Area regions over the next few years.

The purpose of the Farm-Household Economics surveys (FES) is to provide quantitative data on the economics of operation for farm-household units in the Northern Communal Areas, where no such data has previously been available except through ad hoc surveys. The results of the FES should complement information from other research into communal area farming systems, which tend to be more qualitative in nature.

A lot was learned from the Okavango survey concerning data collection and data analyses. Changes have been made between the Okavango and Caprivi surveys. The Okavango data set has been

amended to keep it compatible. However, these changes do not affect the results already published in the Analysis report of the Okavango survey.

There are now two detailed data sets on farm-household resource allocation and utilisation available in Microsoft Access format covering the Okavango and Caprivi regions.

The data sets are fully documented and guidelines on how to analyse the information are available in the survey 'Technical Report'. Further detailed information on the conduct of the survey can be found in the survey document 'Survey Manuals'. The purpose of this report is to present a fairly comprehensive, but by no means exhaustive, analysis of the data for Caprivi only. The report provides information that can be used directly for research or planning purposes. It also attempts to provide readers with a comprehension of the scope and detail of the data and stimulate the further use of the data set to meet specific needs.

3. Organisation of the Report

This report covers the Caprivi survey only and does not attempt to make comparisons with the Okavango survey. Such comparisons will be made in a separate report.

This report has 6 parts.

A Village and household characteristics
B Household non-crop welfare
C Resource utilisation in crop production
D Per hectare crop inputs and output
E Relationships between household characteristics, non-crop welfare and crop production
F Typical farm-household models

These parts provide information on different aspects of farm-household resource allocation and utilisation through one cropping season, which can be read and used independently. The parts are also linked. Parts E and F draw on information generated in the earlier parts to build quantified farm-household models, representing the situations for typical farm-household types in Caprivi.

Although the report contains many tables and charts, these represent neither a comprehensive analysis of the data set, nor a standard way of presenting information from the data set. Readers may feel that the analyses presented in this report are not useful for their own specific purposes. That does not mean that the data set is similarly useless. Many different analyses can be done to examine household resource allocation and utilisation in different ways. Readers are encouraged to contact the Statistics sub-division of the Directorate of Planing for assistance in gaining access to the data and generating analyses that meet their own specific requirements.

4. Description of the Survey

The Farm-Household Economics Survey started in the Caprivi region in mid September 1996 and was completed by the end of June 1997, covering most of the 1996/97 cropping season.

Preparation for the survey started in July 1996 and the newly recruited enumerators were trained for the first two weeks in September 1996. Revised training materials, manuals and questionnaires from the Okavango survey were used for the Caprivi survey. New codes were added to the already existing codebook as differences in farming methods came to light.

The survey was designed as a series of formal questionnaires with clear coding procedures in order to collect quantitative information. The frequency of data collection varied for different questionnaires, the majority of which were completed every 14 days, some were completed quarterly, while others were completed just once.

The following aspects of farm-household economics were covered in the questionnaires:

- Information on the farm workers and their activities on and off-farm
- Use of Draft power (owned and/or hired)
- Non labour and non draft inputs on fields
- Field off-take
- Changes in livestock numbers and the consumption of livestock products
- Household cash income and expenditure
- A household census
- A household inventory of agricultural implements and household items
- Rainfall and Temperature data
- Household field Information
- Records of household member's regular activities
- Prices paid for specific goods

In order to select villages for the survey the Caprivi region was zoned based on the following factors:

- Flood plane allocation
- East Caprivi
- West Caprivi

Due to budget constraints, workload of the enumerators, and an expected high dropout rate it was decided to include a maximum of 30 households per village in the survey. A list of villages for each of the zones was compiled from the 1991 Population Census and two villages from each zone were chosen at random. The villages were Batubaja, Lusesse, Kalimbeza, Muyako, Makanga and Masokotwane. See Map 1.1 in Section A.

After obtaining approval from the village authority to survey a specific village all households were listed in each village. In the case of villages with more than 30 households only 30 households were selected at random for data collection and in the case of smaller villages (villages with less than 30 households) all households were selected for data collection. Where possible, the sample was selected in such a way that the sampled proportion of male and female-headed households reflected that of the whole village. The survey started with 165 households and ended with 146.

Fourteen trainees attended a two-week training course in the first two weeks in September 1996. Most of the trainees were nominees (two or three) from the selected villages, as most of the villages refused to co-operate unless the enumerator came from their own village. At the end of the training period the best six were chosen as enumerators and formal contracts were signed.

Supervision trips were done on a weekly basis by the supervisors who checked and collected the completed questionnaires. Head office staff also made supervisory trips once a month to check on both the supervisors and enumerators.

Several problems were experienced during enumeration. A major problem was the high drop out rate of households in Masokotwane. This was because some households expected payment for their participation in the survey and hence dropped out of the survey when we refused to pay them. Also during the rainy season fields were flooded and farmers migrated to very remote cattle posts where it

was difficult for the enumerator to reach them every two weeks for interviews. Bad road conditions and elephants further obstructed the supervision trips.

Data entering started in Katima Mulilo but was completed in Windhoek due to a shortage of staff in Katima Mulilo. It was finished in December 1997 and data editing was done in January 1998. Data analysis started in February 1998 and was completed in November 1998. The data are available in a Microsoft Access database from the Statistics Unit of the Directorate of Planning, Windhoek.

Further details about the survey and data structures can be found in the 'Technical Report' and 'Survey Manuals' documents, available from the Directorate of Planning, Windhoek.

5. Data Analysis Problems

In any survey problems occur in the collection and analysis of the data, this survey was no exception. However, due to the multi-visit structure of this survey many problems could be corrected during subsequent visits, a luxury not available in most single visit surveys. Hence, due to this and the close supervision of the survey the quality of the data collected should be high. There were some known problems in the data collection and readers should note the following points when interpreting the results.

Questions were usually asked to the head of the household. Where the head was unsure about the activities of other members of the household enumerators were instructed to check with these people.

Livestock numbers are under estimated as farmers kept their livestock at cattle posts where better grazing was available. Due to floods and the distance to these cattle posts (in some cases up to 40 km away from the village) livestock numbers could not be monitored closely.

As far as crop cutting is concerned, farmers started to harvest early, before crop cutting was done and hence no estimates of production were obtained for most of the fields. However farmer estimates were taken which is an additional source of information on crop production.

Cash income is also under enumerated, as many households refused to state their income.

The amount of time spent fishing/hunting is also under estimated as households refused to say if they were hunting.

Where a household dropped out before the end of the survey their data have been excluded from any analysis.

6. Definitions

HOUSEHOLD

A household comprises the farmer and other members of the household who form a consuming and producing unit and a social organisation. Households are often under the management of a single person, but can also operate collectively. Members normally sleep and eat together in the same place, share meals and divide household duties. Household members also share some goals, benefits and resources for which they are independent on some, and in conflict with others. In some cases household members even live a predominant part of their time away from the household, but when they return they assume full household status.

HOUSEHOLD HEAD

The head of the household is the person acknowledged in the household as the head by the other members. The head has primary authority and responsibility for household affairs and is the primary decision-maker.

FIELD

A field is a contiguous area of land owned or rented by a farmer and bounded by a discernible perimeter, which could be demarcated by paths, neighbouring fields, streams etc.

PLOT

A plot is a sub-division of a field containing a single crop or homogeneous mixture of crops. In most cases a plot will be defined by distinct differences in land use from the rest of the field in which it is positioned.

FALLOW

Fallow land is a piece of land, which has been left idle by the farmer without any crops, or labour inputs having been applied. Area under fallow can be left open to grazing and can be assumed to be under the jurisdiction of the household for up to a period of five years.

VISIT

A visit covers a period of fourteen days and is the time taken to complete one interview with all households in a village. Hence the recall period for questionnaires completed each visit is no more than fourteen days. There were two exceptions to this rule; visit one where respondents were asked to recall for the previous four weeks; visit four where a recall period could be up to three weeks.

SESSION

Labour and draft inputs were measured as person sessions (usually just refereed to in the report as a session). A session represents either a morning or an afternoon and can be treated as one half of a day's work. Where an activity is field related a session will include the time taken to get to the field. A session also relates to individuals. Hence 8 sessions spent ploughing a field could be one person working eight sessions or two people working for four sessions etc.

LABOUR DAY

Two sessions make up one labour day. The conversion from sessions to labour days is made by dividing the number of sessions worked by two.

Part A Village and Household Characteristics

A 1 Village Characteristics

A 1.1 Village Locations

The six villages were chosen to represent typical differences in location of villages in the Caprivi region. The location of the villages is given in Map 1.1 below and village differences are summarised in Table A1.1 below.

Map 1.1 Location of the surveyed villages

Surveyed villages:	1. Batubaja	2. Kalembeza	3. Lussese
	4. Makanga	4. Masokotwane	6. Muyako

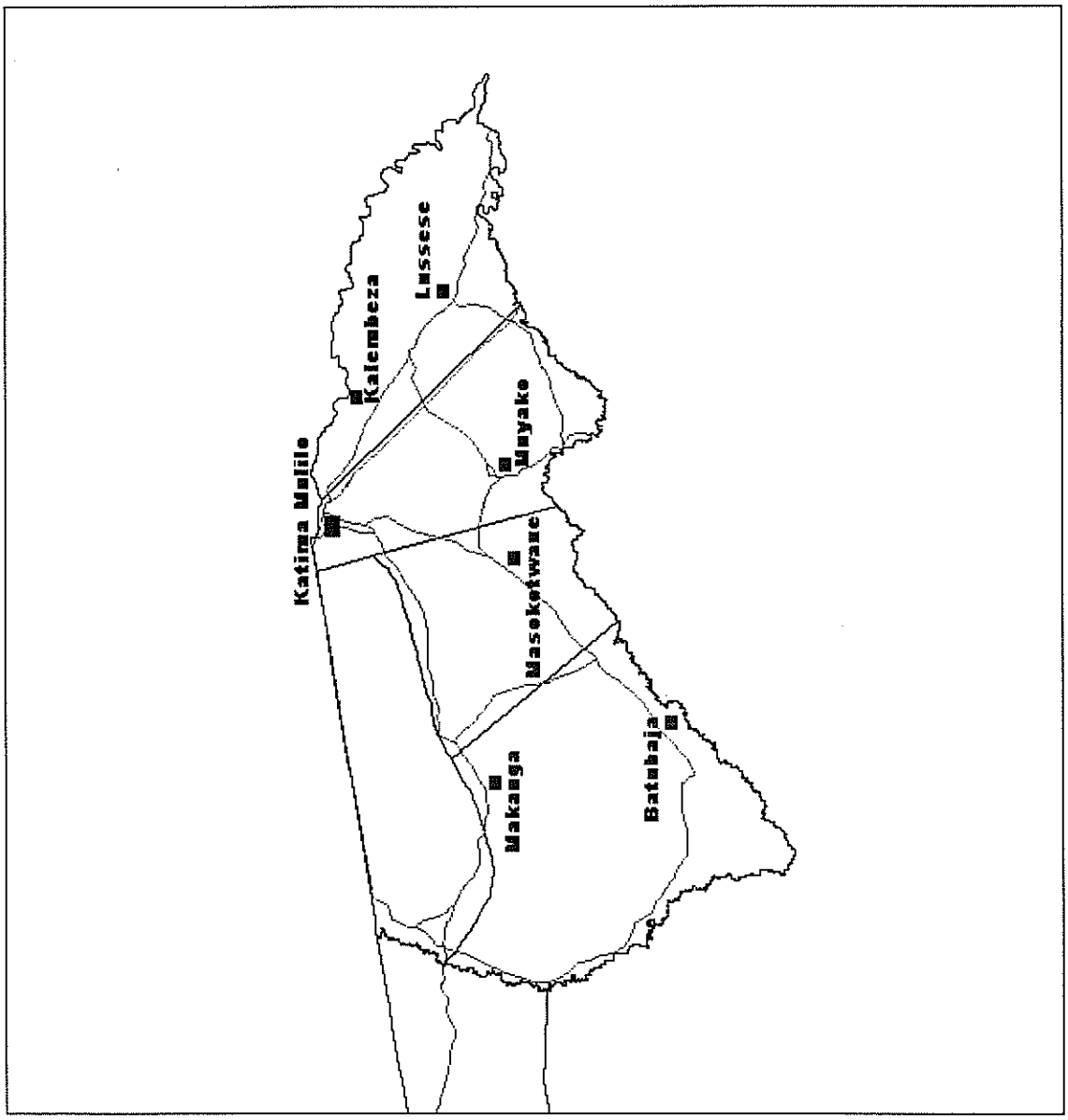


Table A1.1 Village locations and seasonal rainfall

Village	Makanga	Batubaja	Masokotwane	Muyako	Kalembeza	Lusesse
Location	West	West	Central	Central	East Flood plane	East Flood plane
No. households start of survey	30	30	30	26	30	19
No. households end of survey	27	29	21	24	28	17
Rainfall Sept-April 1996/7 in mm	467	465	508	500	473	684

Two villages, Kalembeza and Lusesse are both located in the flood plane area in east Caprivi. Kalembeza is less than 5km away from the Zambezi River, which forms the border between Namibia and Zambia. Makanga and Batubaja are in Western Caprivi with Batubaja beside a main road near the Botswana border. Masokotwane and Muyako are located central and close to Lake Liambezi. The Lake is an important maize production area in Caprivi.

A 1.2 Rainfall

Chart A1.2 shows the rainfall distribution for each village. Lusesse had the best rainfall distribution and highest total rainfall. The rain season effectively started in November for most villages except for Kalembeza, which started in December. During January and February the villages received more than half (58%) of the total rainfall for the season.

Chart A1.3 shows the rainfall figures for Katima Mulilo during the survey and a long-term average rainfall comparison for Katima Mulilo and Andara.

The first rains in Katima Mulilo were recorded in Nov. '96, but the best rains were received in January and February '97. When the long-term average rainfall for Katima Mulilo and Andara (just over 200 kms west of Makanga) is compered a similar rainfall pattern is observed, rains start effectively in November and end in April with the best rainfall period January to February.

When the rainfall of the selected villages are compared with the long term average rainfall (in January) of Katima Mulilo and Andara, the villages in West Caprivi (Makanga and Batubaja) are above average, while the villages in Central Caprivi (Masokotwane and Muyako) are below average.

Chart A1.2 Rainfall by visit

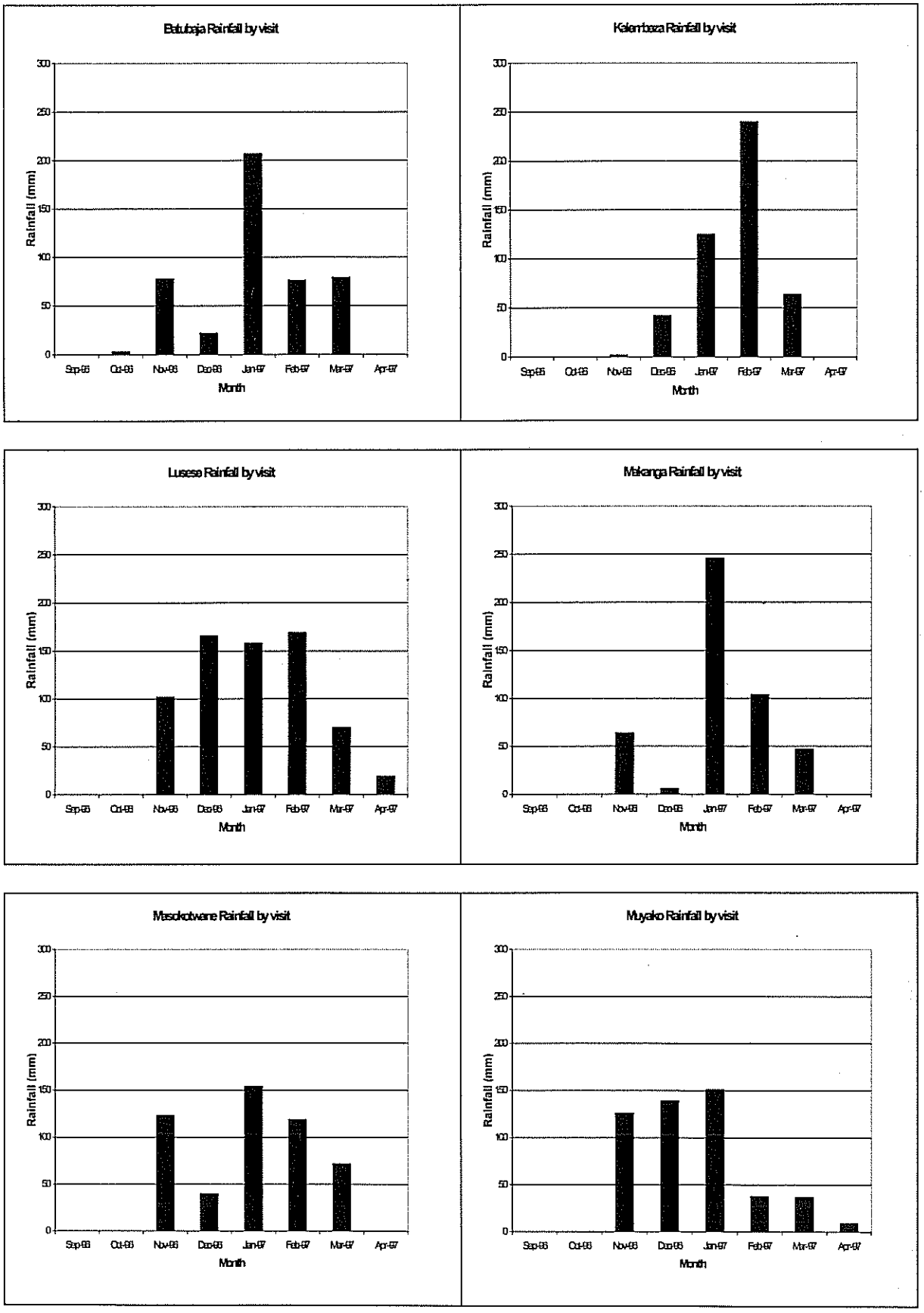
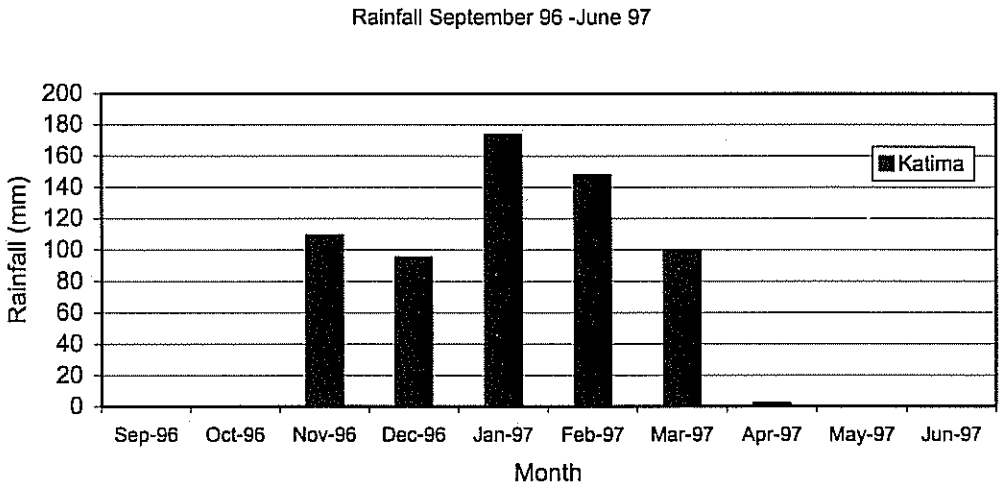
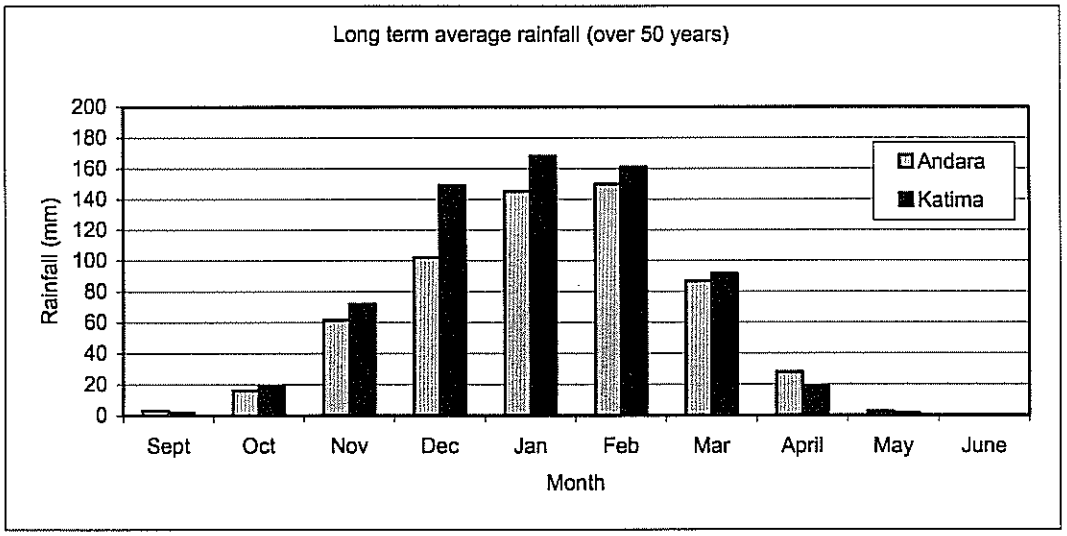
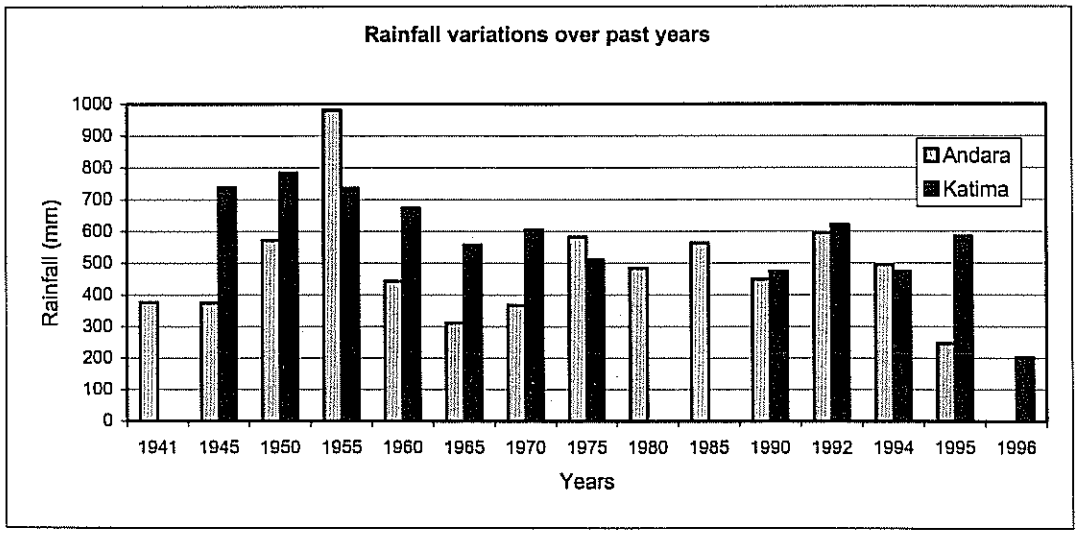


Chart A1.3 Long-term average rainfall







A 1.3 Pests

The following quotes come from: Pest Status Of Locusts and Feasibility Study for Developing a Locust Management Strategy in the Caprivi-Chobe region, done by GTZ/Namibia Constancy, April 1997.

"Of the crops cultivated in the floodplain regions, maize was most important and also the most susceptible to attack by locust. Sorghum and millet were not damaged to the same extent. Maize being a staple food crop is of great importance to the rural subsistence farmers in the region."

"Early maize plantings (December) in the region escape severe damage from locust, mainly because the crop matures ahead of the heaviest locust infestation. However, late plantings (January) do indeed suffer appreciably. However, recurring late summer drought periods also pose serious risk at this time and, in combination with locust, can seriously affect yields."

Crop damage is mainly caused by Red Locust, which became colonised where the Lake Liambezi dried up. Two of the villages included in the survey, Muyako and Masokotwane are located close to this lake. Other minor infestations include Armoured Crickets and Boll Worms.

A 1.4 Field Characteristics

The average age of just over 400 plots measured and monitored in the survey, (Chart A1.4) was 6.2 years. Almost one half of the households have plots ageing between 1 and 5 years. Plots with the highest average age were measured in Lusesse and Makanga, 9.5 and 8.9 years respectively, while the average age of plots in Kalembeza was only 2.7 years.

Farmers were asked for each of their plots what was the MAIN crop grown each year for the past five years. From their responses, continuous grain cropping is the norm, as almost 50% of all plots are planted with the same main crops year after year. Maize and sorghum were planted as main crops on more or less the same number of plots continuously since 1991 (21% of the plots were maize plots and 20% sorghum plots), see Table A1.4. However, only 6% of the plots had millet as their main crop continuously since 1991. With the exception of Masokotwane and Makanga, millet as a main crop was recorded on less than 2% of plots.

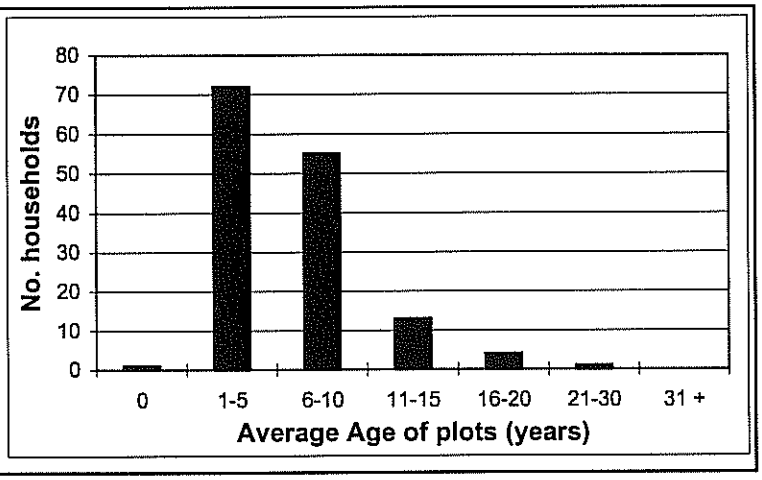
The soil type of 80% of the plots is specified, of which 71% was loamy (mixture of clay and sand). Only 5% of the fields were clay and 4% were sandy. The highest percentage of loamy soil was recorded in Batubaja (96%) and Makanga (92%).

While attempts were made to collect data on fallow fields the information was incomplete and therefore has not been included in this report. Enumerators had problems measuring some fields due to flooding, migration of households, long distances to some fields and difficult access to fields. These factors made it impossible to measure all the fallow fields.

Chart A1.4 Field characteristics

	Batubaja	Kalembeza	Lusese	Makanga	Masokotwane	Muyako	All
Average age in years	4.6	2.7	9.5	8.9	5.3	6.1	6.2

Age (years)	*No. hh's*
0	1
1-5	72
6-10	55
11-15	13
16-20	4
21-30	1
31 +	0
	146



Plot cropping histories by village.

	Batubaja	Kalembeza	Lusese	Makanga	Masokotwane	Muyako	All
Number of plots	69	75	56	77	59	78	414
Maize every year for last five years	14	8	27	6	8	26	89
% maize	20	11	48	8	14	33	21
Millet every year for last five years	2	1		11	8	1	23
% millet	3	1	0	14	14	1	6
Sorghum every year for last five years	13	5	4	13	7	42	0
% sorghum	19	7	7	17	12	54	0

Percentage of plots with different soil types by village.

	Batubaja	Kalembeza	Lusese	Makanga	Masokotwane	Muyako	All
Sandy	0	9	4	4	8	0	4
Clay	4	20	2	0	0	0	5
Loam	96	35	57	92	83	63	71
Grand Total	69	75	56	77	59	78	414

A 2 Household Characteristics

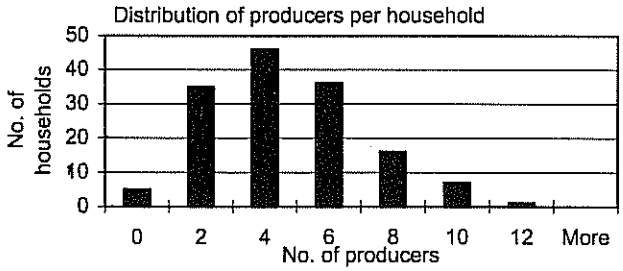
A 2.1 Household Composition and Workforce

Average household size is 6.7 persons, Chart A2.1 below. Muyako has the highest average household size of 9.5 persons, while Batubaja has the lowest (4.8 persons).

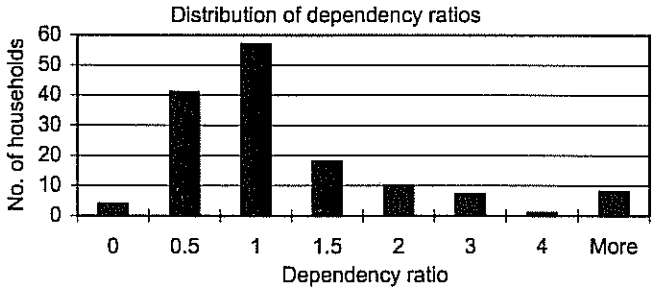
Chart A2.1 Household composition and workforce

	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	Total
Average household size	4.8	6.0	6.3	8.2	5.1	9.5	6.7
Average number hh producers	2.5	4.0	2.9	5.1	2.9	5.2	3.8
Average number of hh dependants	2.3	2.0	3.4	3.1	2.2	4.3	2.8
Average dependacy ratio	0.9	0.5	1.2	0.6	0.8	0.8	0.7

No. producers	*No hh's*
0	5
2	35
4	46
6	36
8	16
10	7
12	1
More	0
	146



Dependency ratio	*No hh's*
0	4
0.5	41
1	57
1.5	18
2	10
3	7
4	1
More	8
	146



Workers used in field activities	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	Total
Not in Groups							
No. of workers	293	195	126	203	123	270	1210
Ave. no. of workers/hh	10.1	7.0	7.4	7.5	5.9	11.3	8.3
In Groups							
No. of workers	7	45	40	105	0	69	266
Ave. no. of workers/hh	0.2	1.6	2.4	3.9	0.0	2.9	1.8
No. of groups used	1	12	5	27	1	12	57
Ave. no. of workers per group	5.0	3.8	8.0	3.8	0.0	5.8	4.6

Household members can be divided into producers (between 15 and 59 years of age) and dependants (children under 15 and persons above 59 years). The average number of producers per household is 3.8 and the average number of dependants per household is 2.8. Of all households included in the survey 41% have on average more then 4 producers. Of the 146 households 30 % had more dependants than producers. A dependency ratio has been calculated by dividing the number of dependants by the number of producers. Ratios greater than one are the result of there being more dependants than there are producers.

Additional labourers are brought in from outside the household for field activities either as individuals or as worker groups (3 or more people doing the same activity). The average number of individual workers (either belonging to the household or brought in from outside

the household) used by households on field activities is 8.3, while on average households use 1.8 workers in the form of workgroups. A total of 57 workgroups were used, with Makanga using nearly half of these and Masokotwane recording none. The average size of a work group was 4.6 workers.

A 2.2 Employment of Household Members

Household members, both males and females are mainly farmers or students. But more male students (42%) than female students (35%) were recorded and more female farmers (58%) than males (48%).

More than a quarter of the households in the survey had at least one wage earner. Over a third of the households in Kalembeza (35.7%) and similarly in Makanga (33.3%) had a wage earner.

Table A2.2 Employment of household members

Number of persons by sex, main occupation and village

Sex	Occupation	Batubaja	Kalembeza	Lusese	Makanga	Masokotwane	Muyako	Total
Male	Farmer/none	29	39	32	57	33	40	230
	Teacher	1	3	0	3	0	0	7
	Police/military	0	2	1	1	0	1	5
	Clerk	0	3	0	0	0	2	5
	Carpenter	0	0	0	0	1	0	1
	Driver	1	1	0	1	0	0	3
	NGO/Co-op	0	1	0	0	0	0	1
	Labourer	2	0	0	0	1	0	3
	Cattle herder	1	1	2	0	1	0	5
	Student	29	27	24	56	11	56	203
	Retired	0	1	0	0	0	0	1
	Other	1	2	0	1	0	12	16
Male total		**64**	**80**	**59**	**119**	**47**	**111**	**480**
Female	Farmer/none	47	46	37	63	37	48	278
	Teacher	1	1	0	0	0	2	4
	Police/military	0	2	0	0	0	0	2
	Clerk	0	6	1	1	0	0	8
	Shopkeeper	1	0	0	0	0	0	1
	Labourer	0	0	0	2	0	0	2
	Student	23	28	16	39	15	45	166
	Retired	0	4	0	2	0	0	6
	Other	0	0	0	0	0	9	9
Female total		**72**	**87**	**54**	**107**	**52**	**104**	**476**

Number of people aged 15 years and over by wage earner and village

	Batubaja	Kalembeza	Lusese	Makanga	Masokotwane	Muyako	Total
Total no. of wage earners	8	14	4	10	5	10	51
No. of households reporting	29	28	17	27	21	24	146
Households with wage earners	7	10	4	9	5	4	39
% households with wage earners	24.1	35.7	23.5	33.3	23.8	16.7	26.7

A 2.3 Age of Household Members and Dependency Ratios

The age structures of the village populations are similar, see Chart A 2.3. When all villages are combined, see Chart A 2.4, the graph does not have the pyramid shape usually associated with rural populations. There appears to be an under enumeration of children in the 0 to 9 age cohorts.

Chart A2.3 Age distribution for each village

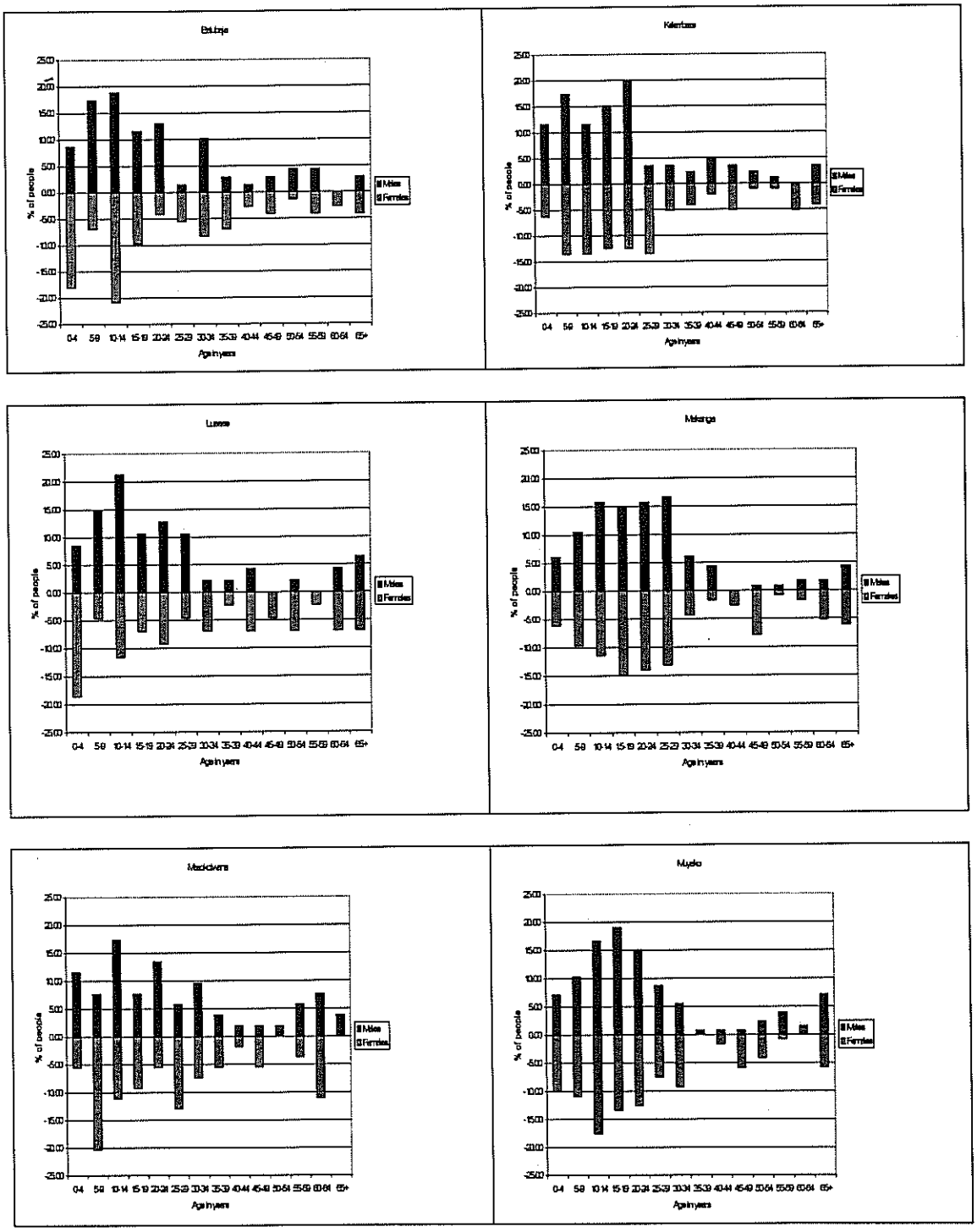
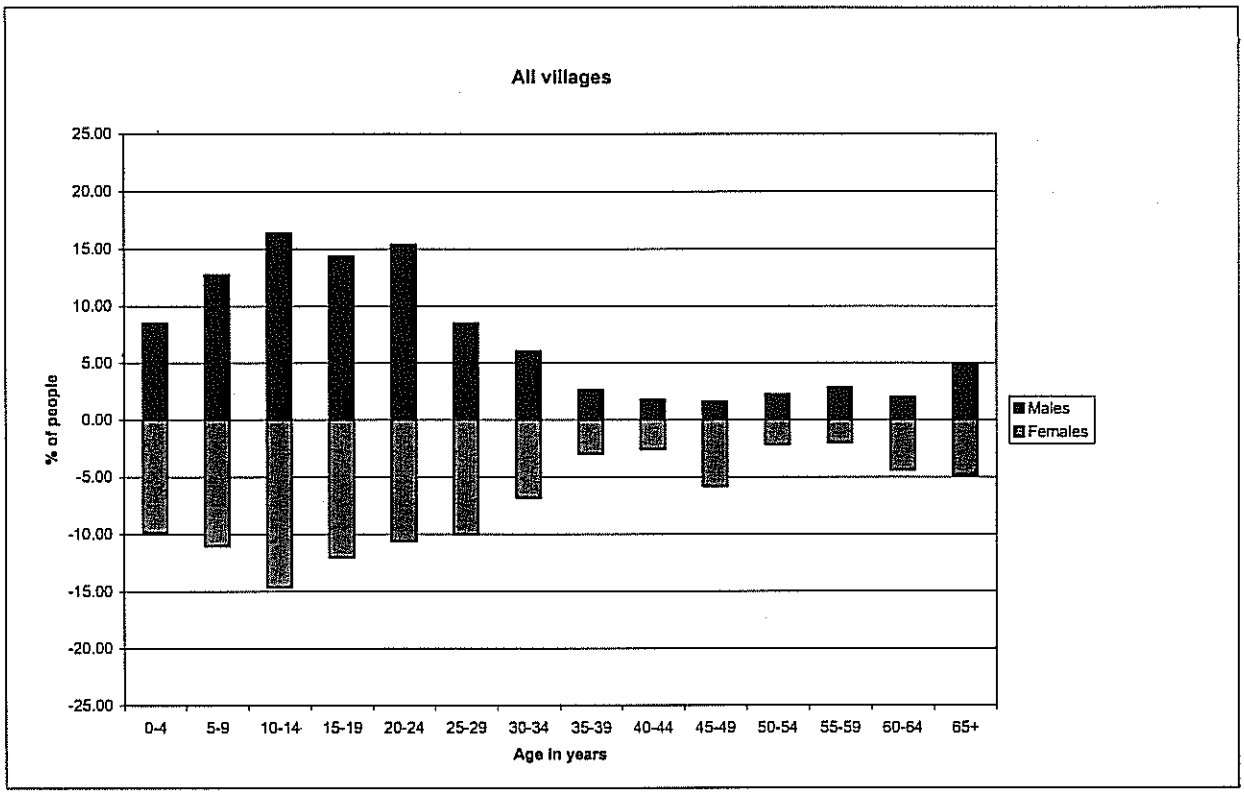


Chart A2.4 Age distribution for all villages



A 2.4 Ownership of Assets

Major types of assets owned by households include livestock, cultivation equipment and transport equipment, Chart A2.5 below.

Of all households 16% do not own any cattle. Of the 146 households 47% own more than 10 head of cattle.

80% of the households do not own goats. Herd sizes vary between 1 and 50, but only two households were recorded with herd sizes of more then 30. Of the 20% who owns goats, more than half (55%) of the households own between 1 and 5 goats.

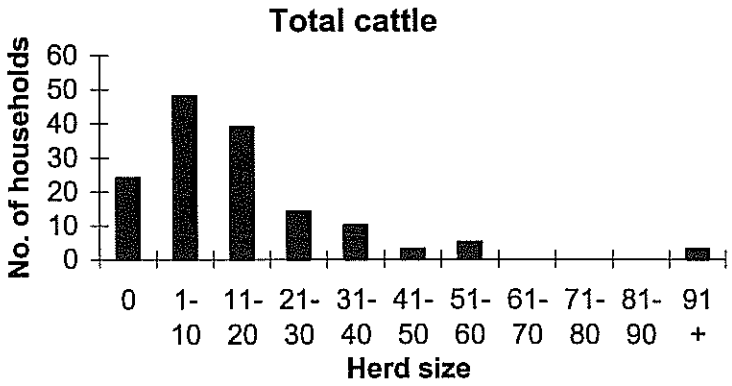
Less than 50% of the households own poultry. Flock sizes vary between 1 and 70, but most households own between 1 and 10 birds.

Only 47% of households own cultivation equipment (plough, harrow, planter) of which almost 62% own 1 item of equipment. The remaining households own mainly 2-3 different items of equipment.

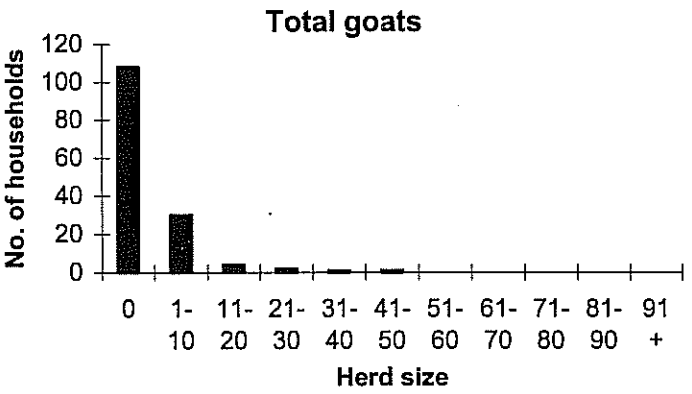
Of all households, 56% do not own traditional transport (sledges, ox carts, etc.). Of the households owning, 52% own one type of transport.

Chart A2.5 Ownership of assets

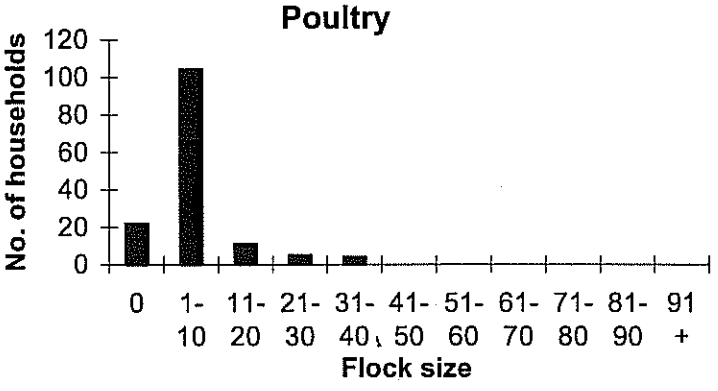
Herd size	No. hh's
0	24
1-10	48
11-20	39
21-30	14
31-40	10
41-50	3
51-60	5
61-70	0
71-80	0
81-90	0
91 +	3
	146



Herd size	No. hh's
0	108
1-10	30
11-20	4
21-30	2
31-40	1
41-50	1
51-60	0
61-70	0
71-80	0
81-90	0
91 +	0
	146



Flock size	No. hh's
0	22
1-10	104
11-20	11
21-30	5
31-40	4
41-50	0
51-60	0
61-70	0
71-80	0
81-90	0
91 +	0
	146



A 2.5 Average Session Lengths and Regular Activities

The survey attempts to collect data on activities such as harvesting, weeding to the nearest whole session (half-day). However, these activities could have been done for only part of a session. In order to gather more detailed information on how long these sorts of activities took a separate quarterly questionnaire was used. Information on the average number of hours

spent doing certain activities was collected and is given in Table A2.6 below. The times exclude travelling time.

Table A2.6 Average number of hours per session for key activities

Actiivity	Average hours done per session
Land preparation	3.4
Hand hoeing	3.8
Ploughing - tractor	3.7
Ploughing - animal draft	4.2
Planting - hand	4.1
Weeding - hand	5.7
Havesting	5.5
Threshing	5.5

It is clear from this table that if a session is taken as four hours then when an activity is done people spent on average most of a session on the above activities. Mostly these activities were done in the morning, with the exception of herding, gathering and fetching firewood.

The survey also attempted to obtain information on 'Regular Activities'. These were activities done on a frequent basis by household members in fields and around the household but were not collected on the questionnaire on work activities. Information on the average number of hours spent doing certain regular activities was collected and is given in Table A2.7 below. The times exclude travelling time.

Table A2.7 Average number of hours per session for regular activities

Regular Actiivity	Average hours done per session
Herding cattle	7.6
Herding smallstock	3.0
Milking	1.3
Feeding stock	7.5
Fetching water	1.3
Fetching firewood for own use	1.7
Fetching firewood for sale	1.0
Gathering draft animals	3.2

The highest number of hours per session on average over the survey period was spent on herding cows and feeding stock, over 7 hours per sessions on average for both activities, that is about two sessions. Herding smallstock and gathering draft animals takes about one session. On the remaining activities like milking, fetching firewood, etc. spent about one quarter to one half a session on average.

Part B Household Non-crop Welfare Status

For rural households in Caprivi, cash and livestock are the main sources of livelihood outside of cropping and hunting and gathering. Households will measure their welfare through a season before crop production in relation to their net gains from the production and use of cash and livestock.

First will be levels of cash income obtained from various sources, sales of beer, handicrafts, pensions, remittances and wages. Against this will be the cash expenditures households need to make to exist through the season. The balance of cash incomes and expenditures can then be treated as the first element of a household's non-crop welfare

The second element of non-crop welfare will be derived from livestock production. Again this has consumption and income elements. Households can expect to increase the value of their livestock holdings through a season, unless deaths and slaughters are greater than births and other gains (purchases, gifts). Welfare gained from livestock can then be measured in terms of net changes in the value of livestock. However welfare gains also come from the consumption of livestock products and the value of this own consumption must also be included in the welfare measure.

In this section we will build up a profile of household welfare from sources other than crop production, which will include:

1. Cash income and expenditure

2. Welfare gained from livestock

   2.1 Value of own consumption of livestock products
   2.2 Changes in value of stock

For each of these welfare elements we will look at distributions by source, by season, by village and by household.

B 1 Cash Income and Expenditure

B 1.1 Seasonal Income and Expenditure

The total Income and Expenditure of the villages over the survey period (Sept. '96 to May '97) is given in Table B1.1 which is summarised in Chart B1.2 below. Over this period the average cash expenditure over all households was N$1 714 of which N$ 713 (42%) was spent on food, mainly maize meal N$ 284 (40%), meat N$ 127 (18%) and sugar/salt N$ 127 (18%), see Tables B1.3 and B1.4 below. Nearly one third of the average cash expenditure over the survey period was spent on services N$ 525 (31%) which can be divided as follows: N$ 208 (40%) for hired labour, N$ 159 (30%) for school fees and N$ 96 (18%) on hired transport.

The main sources of income are earnings and sales. Earnings contribute N$ 1 516 (50%) to total income, mainly through pensions N$ 772 (51%), wages N$ 448 (30%) and remittances N$ 290 (19%). Sales account for N$ 1 252 (41%) of the total income, of which more than half

is generated through livestock sales N$ 686 (55%) other main generators of income are beer sales N$ 275 (22%) meat sales N$ 117 (9%).

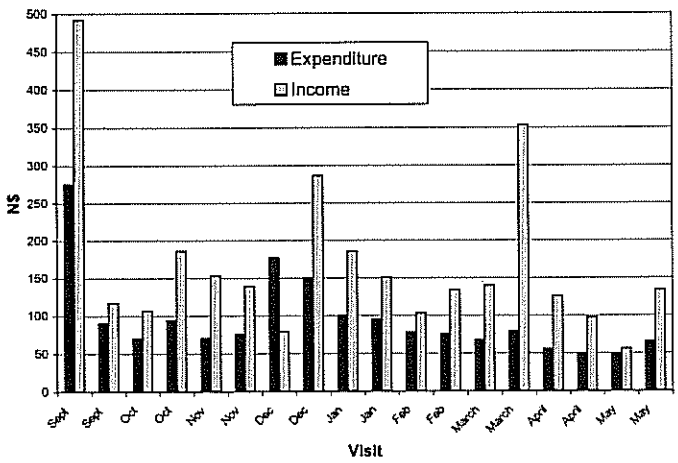
Table B1.1 Expenditure/income average over all households (N$ per 2 week period)

	Sep	Sep	Oct	Oct	Nov	Nov	Dec	Dec	Jan	Jan
Expenditure										
Food	119	38	37	48	41	35	52	57	38	35
Capital	81	25	16	19	9	13	8	50	20	10
Services	74	26	17	23	18	22	28	42	42	49
Loans	1	1	0	3	2	6	89	1	0	1
Income										
Credit	4	3	1	1	6	39	2	59	30	4
Sevices	13	4	4	15	3	2	3	7	3	3
Earnings	246	70	38	111	102	47	37	73	91	68
Sales	228	41	64	59	42	51	36	148	60	75
All Expenditure	**275**	**90**	**70**	**94**	**70**	**75**	**177**	**150**	**100**	**94**
All Income	**492**	**117**	**107**	**186**	**153**	**139**	**79**	**286**	**185**	**151**

	Feb	Feb	Mar	Mar	Apr	Apr	May	May	Total	% of all Exp
Expenditure										
Food	27	30	33	30	24	26	23	22	713	42
Capital	7	15	10	29	10	9	10	17	360	21
Services	42	29	21	19	21	13	16	23	525	31
Loans	1	2	4	0	1	1	0	3	117	7
Income										**% of all Inc**
Credit	4	3	6	7	3	5	2	3	181	6
Sevices	5	2	9	4	1	2	2	3	87	3
Earnings	15	52	98	287	30	47	20	83	1516	50
Sales	80	76	26	56	92	43	31	44	1252	41
All Expenditure	**77**	**75**	**67**	**79**	**55**	**49**	**49**	**66**	**1714**	
All Income	**103**	**134**	**139**	**353**	**126**	**97**	**56**	**133**	**3036**	

Chart B1.2 shows the average Income and Expenditure per household over the survey period. Throughout the survey cash income exceeds cash expenditure, except for the first two weeks in December '96. In most cases cash income every two weeks is more than N$100, while cash expenditure every two weeks is more likely to be less than N$100. Households therefore tend to have rather cash surpluses than cash deficits.

Chart B1.2 Income and expenditure - average per household (N$ per 2 week period)



B 1.2 Detailed Income and Expenditure

Tables B1.3 and B1.4 below give a detailed break down of the average income and expenditure over the survey period by households on major items. From Table B1.3, livestock was the largest income generator from sales at an average of N$ 686 per household and pensions at N$ 772 the largest source of income from earnings.

Table B1.3 Detailed income averages over all households (N$)

Sales average income per hh							
	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Crops	29	1	15	77	18	0	24
Livestock	634	838	715	278	216	1420	686
Meat sales	323	0	41	73	2	206	117
Milk/eggs sales	8	5	45	0	27	48	20
Fish sales	0	11	109	0	13	5	18
Firewood	0	0	2	0	2	0	1
Crafts	9	0	186	1	8	4	25
Beer	140	130	1254	253	151	46	275
Other sales	13	63	231	130	64	74	87

Earnings/Credit Average income per hh							
	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Remittances	235	250	414	385	118	359	290
Wages	324	586	148	417	1007	196	448
Pensions	449	308	828	1976	472	573	772
Other earnings	0	0	0	22	0	9	6
Inc credit	28	3	29	342	316	382	181

Services Average income per hh							
	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Hire labour	87	70	145	56	87	70	82
Hire transport	2	1	0	8	0	3	2
Hire draft	2	0	0	0	3	8	2
Other service income	0	2	0	0	0	2	1

During the survey an average of N$ 284 was spent by a household on maize meal, the largest food item, see Table B 1.4. N$ 182 was spent on clothes, N$ 208 on hire of labour services.

Table B1.4 Detailed expenditure averages over all households (N$)

Food average expenditure per hh							
	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Maize meal	207	420	228	84	152	600	284
Maize grain	21	15	39	0	21	184	45
Millet grain	32	20	89	0	45	8	29
Millet meal	0	0	6	0	0	0	1
Vegatables	14	16	7	51	14	26	23
Meat expenditure	150	100	114	161	108	121	127
Milk/eggs expenditure	13	4	35	2	46	15	17
Fish expenditure	3	43	52	29	17	52	31
Sugar/salt etc	122	97	199	185	79	91	127
Other food	35	38	0	11	33	60	31

Table B1.4 Detailed expenditure averages over all households (N$) (Continued)

Capital average expenditure per hh							
	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Furniture	28	89	22	30	0	27	35
Clothes	203	108	331	188	164	148	182
Farm equipment	17	1	25	21	23	42	20
Other capital items	185	4	37	120	169	201	122

Services/Loans average expenditure per hh							
	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Hire labour services	115	94	406	145	85	495	208
Hire transport services	73	37	61	128	115	164	96
Hire draft services	29	0	0	12	46	55	24
School	175	92	189	208	108	183	159
Clinic	31	8	22	72	20	22	30
Other service expenditure	22	0	6	1	14	0	7
Expenditure on loans	1	27	3	68	65	542	117

Table B1.5 below shows the distribution of Income and Expenditure across villages. In Lussese (N$ 4 161) and Makanga (N$ 4 019) cash income was the highest, while it was the lowest in Kalembeza (N$ 2 268) and Batubaja (N$ 2 283). This is surprising as the highest number of wage earners (14 or 14% a major source of income, see Table A2.2 earlier) was recorded in Kalembeza.

Table B1.5 Cash income and expenditure by village

	Batubaja		Kalembeza		Lussese		Makanga		Masokotwane		Muyako		All	
Expenditure		%		%		%		%		%		%		%
Food	596	40	751	62	769	41	523	34	516	39	1,157	38	713	42
Capital	433	29	202	17	416	22	360	24	356	27	418	14	360	21
Services	444	30	231	19	683	37	572	38	389	29	919	30	525	31
Loans	1	0	27	2	3	0	68	4	65	5	542	18	117	7
Income		%		%		%		%		%		%		%
Credit	28	1	3	0	29	1	342	9	316	13	382	11	181	6
Services	92	4	73	3	145	3	64	2	90	4	81	2	87	3
Earnings	1,009	44	1,144	50	1,389	33	2,801	70	1,597	64	1,137	33	1,516	50
Sales	1,155	51	1,049	46	2,597	62	812	20	501	20	1,802	53	1,252	41
All Expenditure	**1,474**		**1,212**		**1,871**		**1,524**		**1,326**		**3,035**		**1,714**	
All Income	**2,283**		**2,268**		**4,161**		**4,019**		**2,504**		**3,403**		**3,036**	

The highest expenditure was recorded in Muyako (N$ 3 035), much more than the next highest which was recorded in Lussese (N$ 1 871). This is due to Muyako's high expenditure on both food and services when compared to other villages.

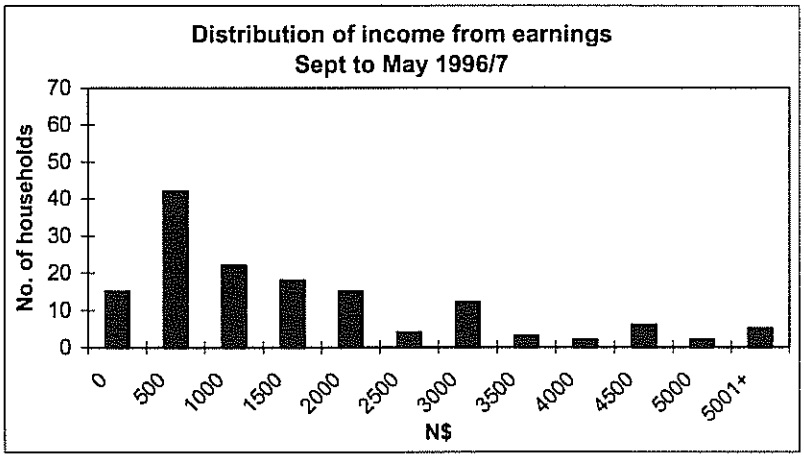
B 1.3 Distribution of Income and Expenditure

As discussed above, earnings and sales are major contributors to a households income, see Table B1.1 above. It is therefore interesting to look at the distribution of total income from earnings and sales over all villages, see Chart B 1.6 below. Fifteen or 10% of households had no income from earnings and nearly half or 44% (64) of households had total incomes between 1 and 1000 dollars. The distribution of income has a long tail with 12 % of households earning over N$ 3 000. A similar pattern emerges for the distribution of income from sales. Ten households (7%) had no income from sales and over half (52%) of

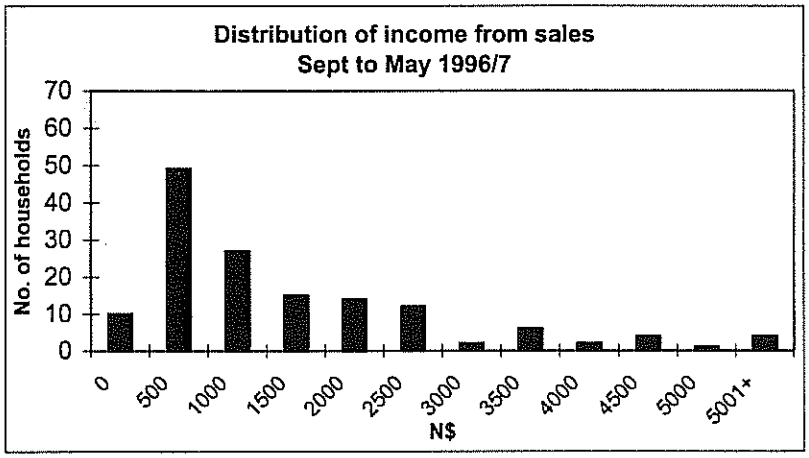
households had an income of between 1 and 1000 dollars. Again, the distribution has a long tail with 12 % of households earning over N$ 3 000.

Chart B1.6 Distribution of income from earnings and sales

Earnings	*No. hh's*
0	15
1-500	42
501-1000	22
1001-1500	18
1501-2000	15
2001-2500	4
2501-3000	12
3001-3500	3
3501-4000	2
4001-4500	6
4501-5000	2
5001 +	5
	146



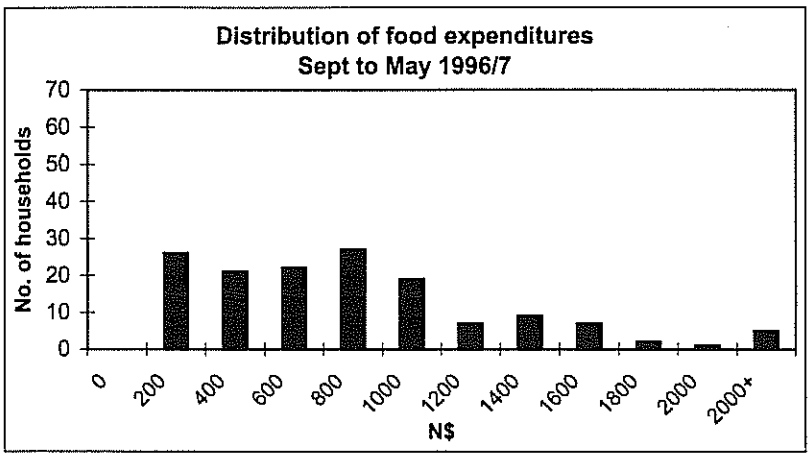
Sales	*No. hh's*
0	10
1-500	49
501-1000	27
1001-1500	15
1501-2000	14
2001-2500	12
2501-3000	2
3001-3500	6
3501-4000	2
4001-4500	4
4501-5000	1
5001 +	4
	146



Food was the largest household expenditure, see Table B1.1 above. Chart B 1.7 below looks at the distribution of household expenditure on food. The distribution is compact with 79% (115) of households spending between 1 and 1000 dollars. All households in the survey spent some cash on food.

Chart B1.7 Distribution of expenditure on food

Expenditure	*No. hh's*
0	0
1-200	26
201-400	21
401-600	22
601-800	27
801-1000	19
1001-1200	7
1201-1400	9
1401-1600	7
1601-1800	2
1801-2000	1
2001 +	5
	146

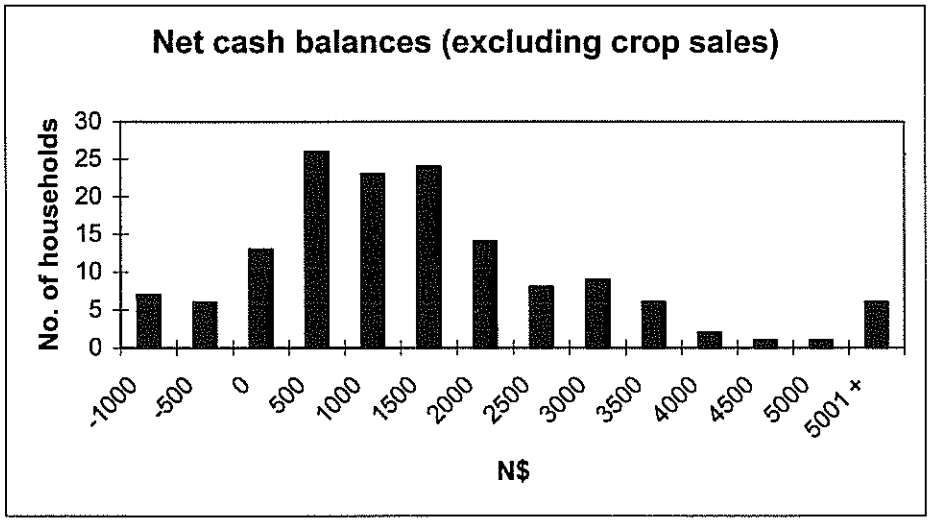


B 1.4 Distribution of net cash balances

Chart B1.8 shows the distribution of cash income from non-crop products, part C of this report looks at income from cropping. More households had cash surpluses than deficits with 18% (26) of households having net cash balances of 0 or less. 60% of households had positive balances of between 1 and 2000 dollars.

Chart B1.8 Distribution of net cash balances (excluding income from non-crop products)

Balance	*No. hh's*
-1000	7
-500	6
0	13
500	26
1000	23
1500	24
2000	14
2500	8
3000	9
3500	6
4000	2
4500	1
5000	1
5001 +	6
	146



B 2 Own Consumption of Livestock Products

B 2.1 Consumption of Own Cattle Products (*milk excluded*)

Chart B2.1 below shows for those households who own cattle the proportion consuming their own cattle products in each two-week period. The proportion consuming was very small and sparsely distributed over the season, in most cases less than 20% for all villages. High percentages of consumption were recorded in Batubaja, Muyako and possibly Makanga during the first two weeks of September. These may be due to interviewees recalling events that occurred before the required two-week period at the start of the survey and so should be treated with caution. Refer to Table A 2.5 for herd sizes.

Chart B2.1 Percentage consumption of cattle by households owning

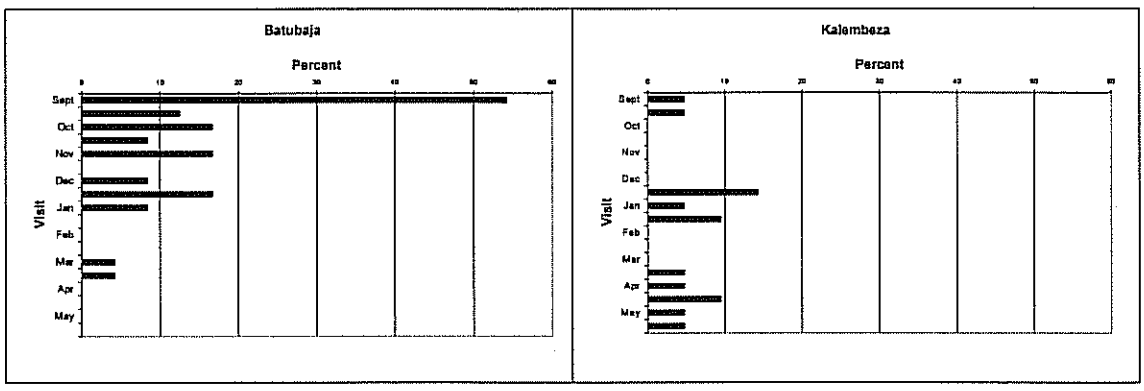
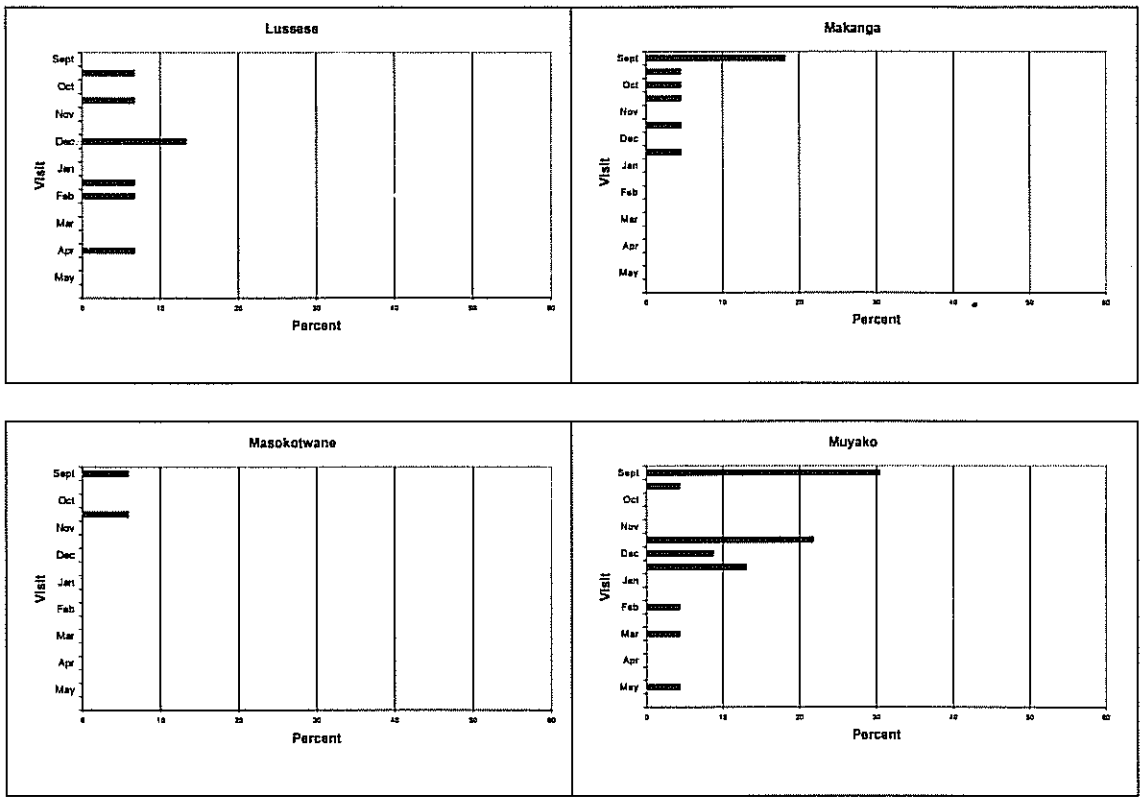


Chart B2.1 Percentage consumption of cattle by households owning (Continued)



B 2.2 Consumption of Own Goat Products

Consumption of own goat products mainly occurs in Muyako. In all villages during any two-week period goat consumption is never higher than 20% except for Muyako and Makanga in the first two-week period. These high figures again should be treated with caution as they could be due to a longer recall at the start of the survey as mentioned above for cattle consumption.

Chart B2.2 Percentage consumption of goats by households owning

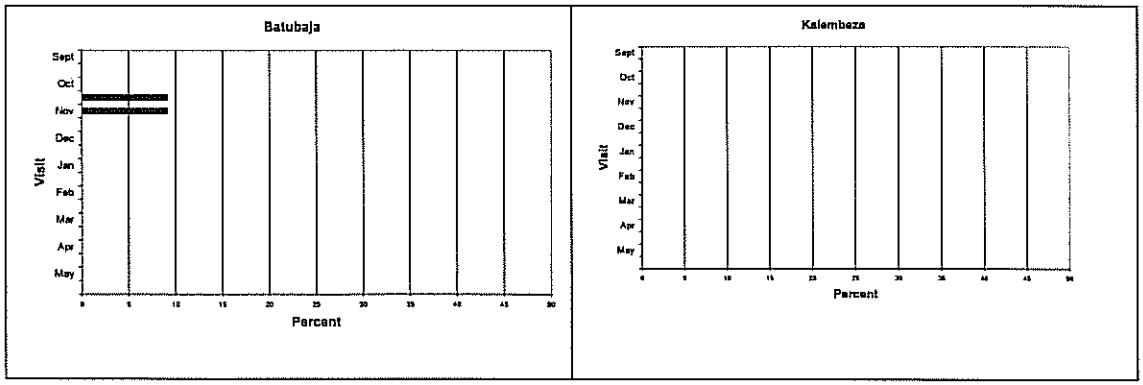
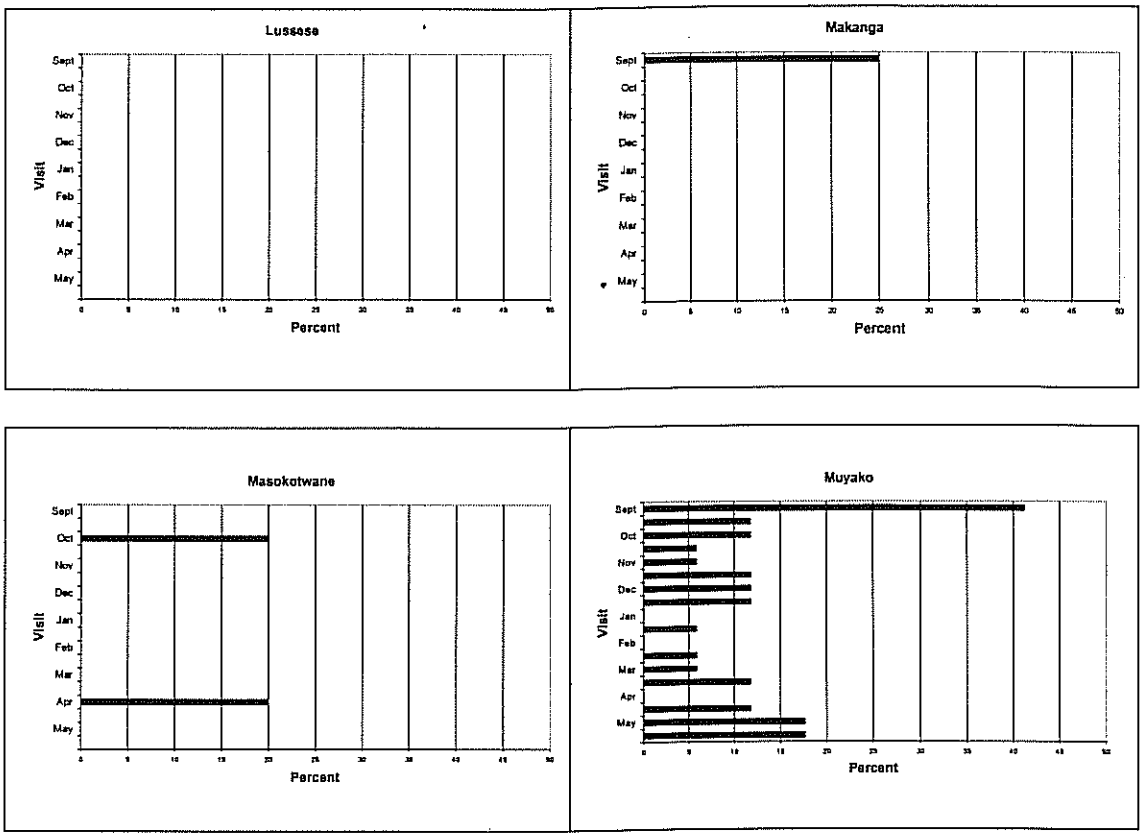


Chart B2.2 Percentage consumption of goats by households owning (Continued)



B 2.3 Consumption of Own Poultry Products

Chart B2.3 indicates that consumption of own poultry products is both more common than either goats or cattle. In Muyako and Lussese poultry consumption is the highest and fairly consistent over the survey period. Consumption is noticeably low in Masokotwane.

Chart B2.3 Percentage consumption of poultry owning households

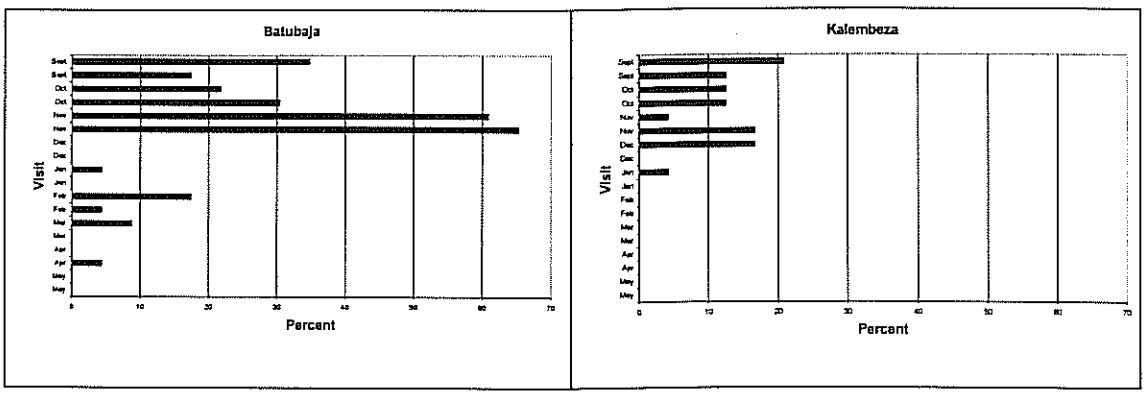
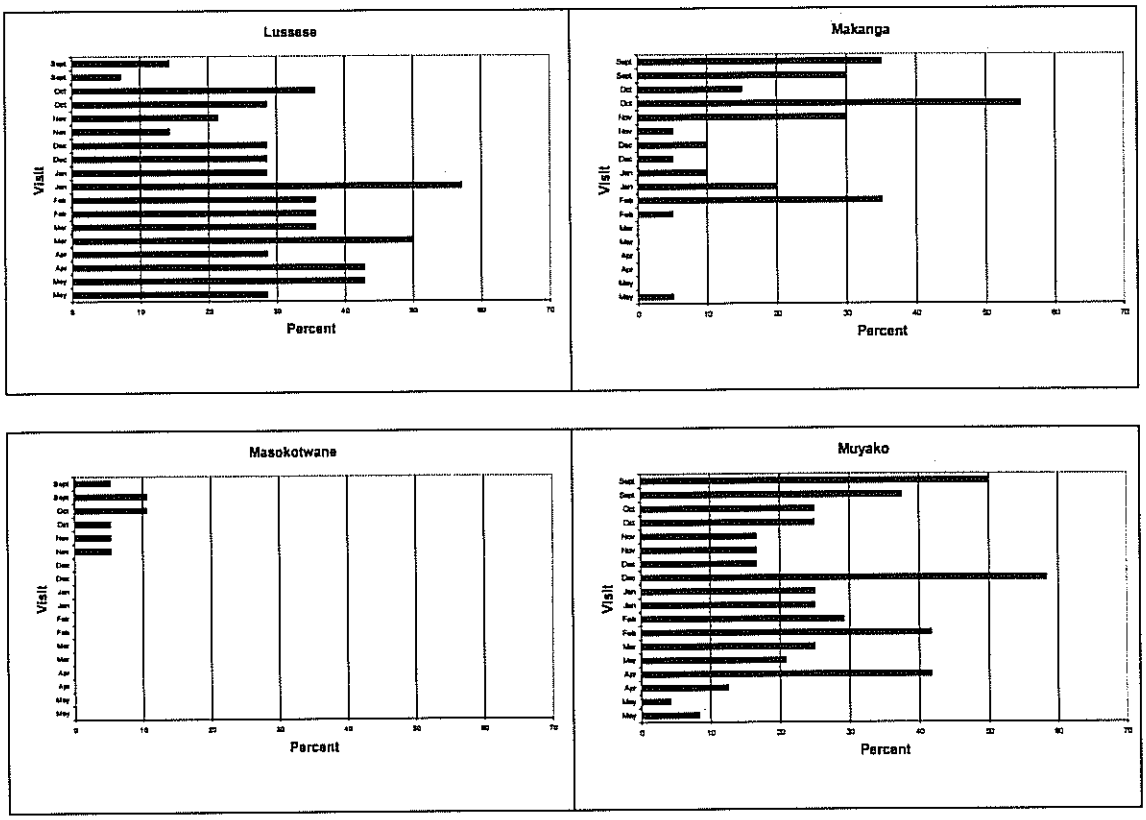


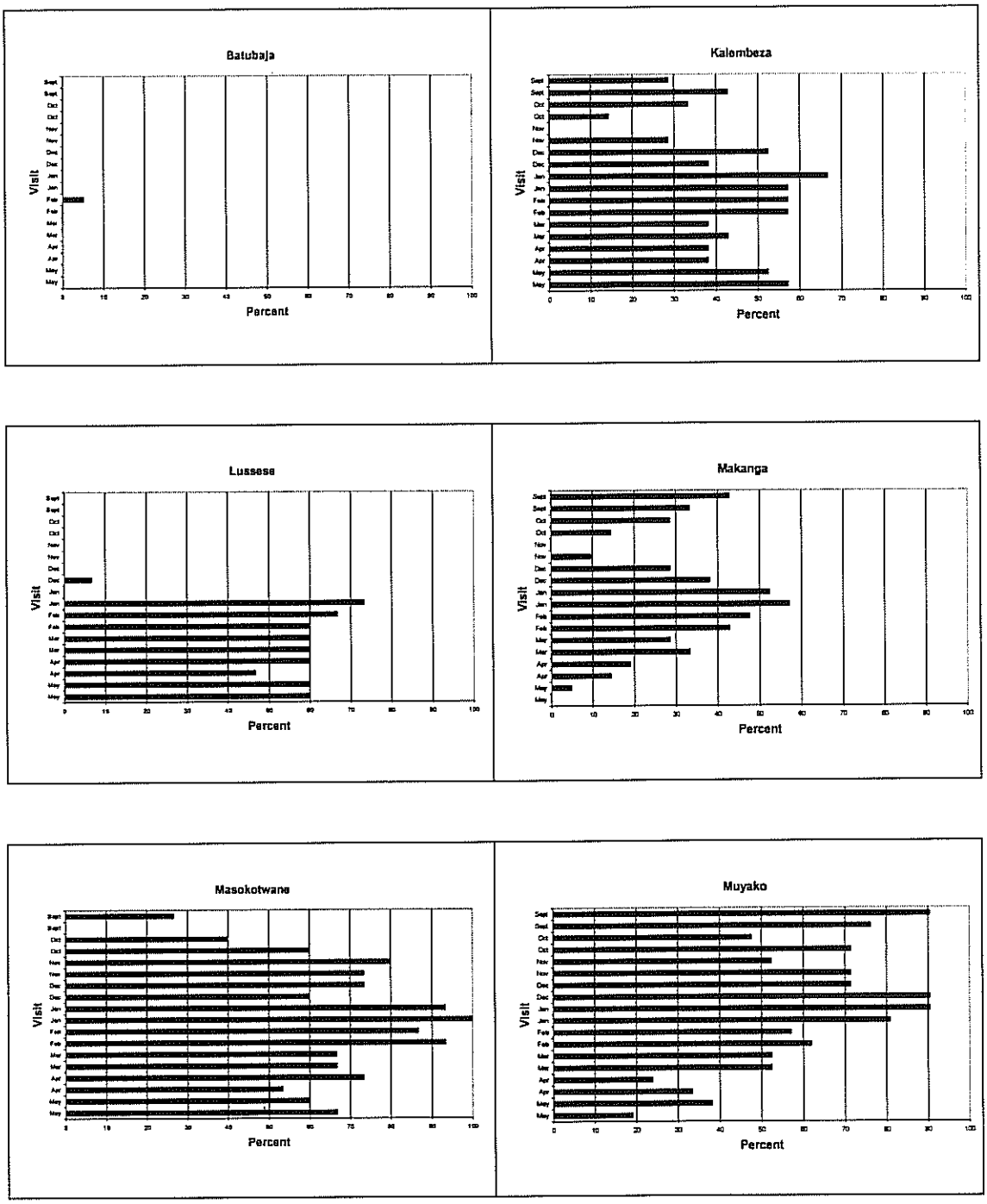
Chart B2.3 Percentage consumption of poultry owning households (Continued)



B 2.4 Consumption of Own Milk Products

Chart B2.4 indicates high consumption of own milk products in all villages except for Batubaja. The peak for milk consumption was reached over the rainy season, late December-January in most of the villages. In Masokotwane and Muyako consumption of own milk products is the highest with over 70% of households consuming milk products in the period November to February.

Chart B2.4 Percentage consumption of milk for cattle owning households

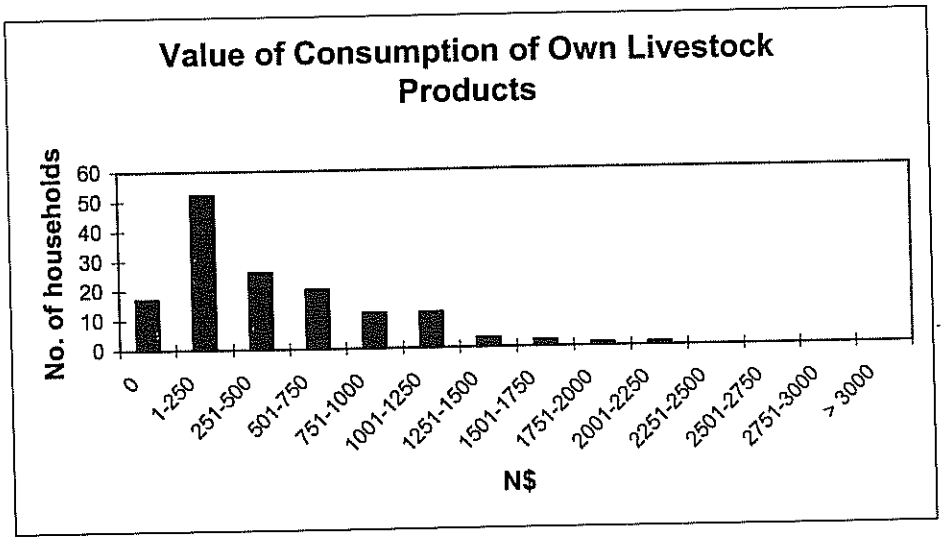


B 2.5 Value of consumption of Own Products

Each two-week period households were asked for their consumption and its value (to the nearest dollar) of livestock products such as meat, skin, eggs, milk etc. These values have been summed for each household and the resulting distribution is show in Chart B2.5 below. 12% (17) households had zero value of consumption. 67% (98) households had a value of between 1 and 750 dollars.

Chart B2.5 Distribution of households by value of consumption of own livestock products

Value	No. hh's
0	17
1-250	52
251-500	26
501-750	20
751-1000	12
1001-1250	12
1251-1500	3
1501-1750	2
1751-2000	1
2001-2250	1
2251-2500	0
2501-2750	0
2751-3000	0
> 3000	0
	146



B 3 Changes in Livestock Numbers

Changes in livestock numbers over time will contribute to increases and decreases in household wealth. These changes in livestock numbers can be expected to vary across the season. Through a season households will experience net gains or losses. It should be noted that the survey covers a period of 9 months from September 1996 to May 1997 and as such only captures part of the livestock changes that can occur in a year.

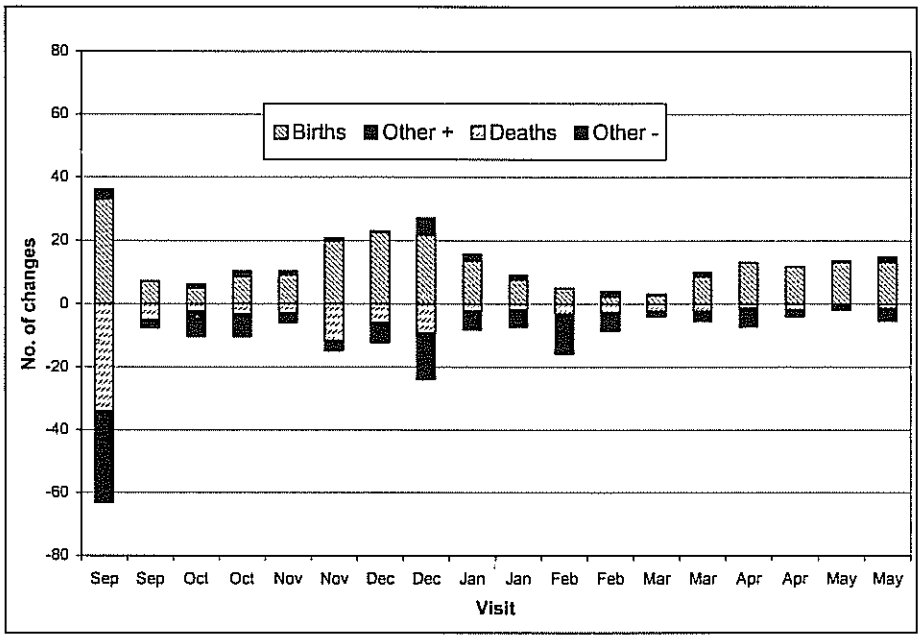
B 3.1 Seasonal Changes in Livestock Numbers

Charts B3.1 to B3.2 below show the changes per 1000 head of cattle, small stock (mainly goats in Caprivi) and poultry.

There may be problems with the data for the first visit, early September. Although the farmers were asked to recall events occurring during the previous two weeks during this enumeration visit, they could have recalled events earlier than that, as there was no definite reference point for the farmer. For subsequent interviews the farmers were asked to recall events since the enumerators last visit, giving them a definite reference point. Therefore the data for the first enumeration visit should be treated with caution and is mostly ignored in the following comments.

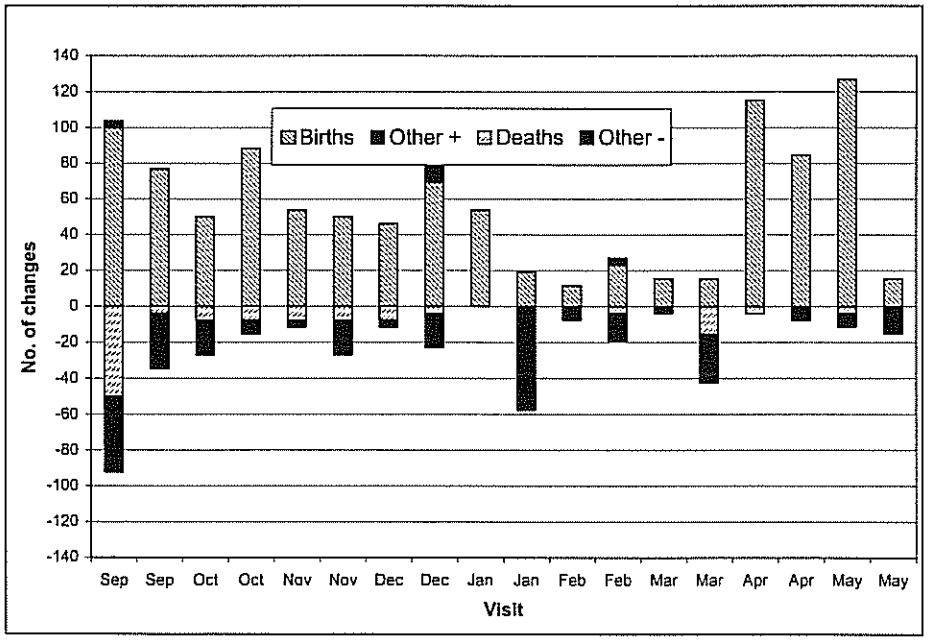
Cattle losses throughout the survey are mainly due to selling and slaughtering. The largest changes in cattle and goat numbers were recorded at the start of the survey, which could be due to problems with the recall period mentioned above. Ignoring the first visit, the two week periods included in the festive season (late November '96 to the end of December '96) could be considered as the main period during which cattle numbers changed. During this period the largest increases were recorded (mainly through births), as well as the largest decreases (mainly through deaths, slaughtering and selling). Changes in cattle numbers declined towards early March '97 but towards the end of March '97 increases (mainly through births) were recorded.

Chart B3.1 Cattle changes per 1000 head



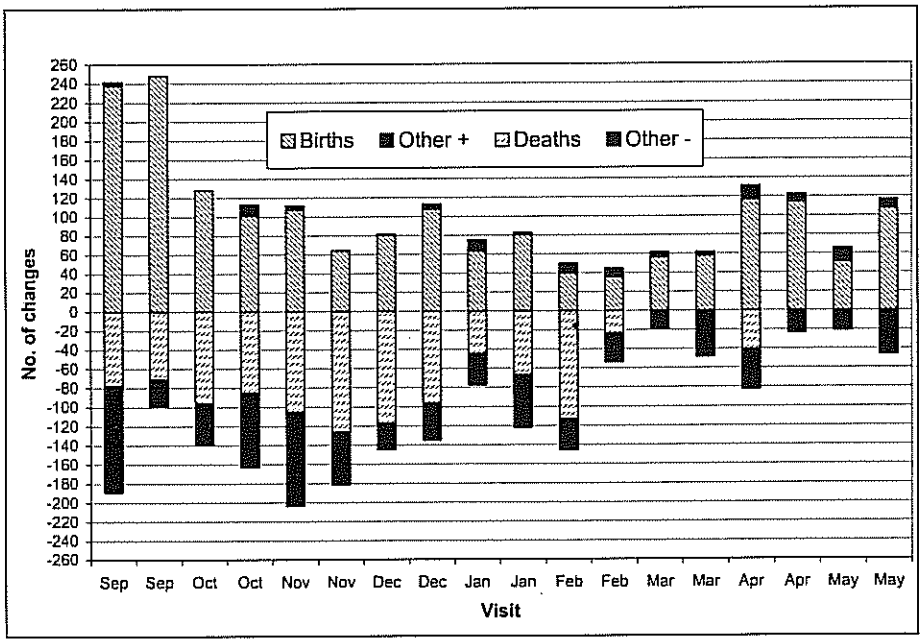
The main reason for increases in smallstock numbers was births, which were recorded during every visit throughout the survey. From September '96 until early January '97 considerable more births than selling or slaughtering were recorded, as well as in April '97 and early May '97. Most slaughtering or selling was recorded late January '97.

Chart B3.2 Smallstock changes (per 1000 head)



The dominant source for increases in poultry numbers is births, while decreases are mainly caused by deaths. Large changes were recorded from early September '96 through to late December '96 but fewer were recorded since January '97 to the end of the survey.

Chart B3.3 Poultry changes per 1000 head



B 3.2 Value of Livestock Changes

Households recorded both losses and additions to their herds each two-week period during the survey. The following values were then assigned to each animal and a net balance calculated for each household.

Type of animal	Value in N$ per animal
Cattle	600.0
Calves	300.0
Smallstock (including donkeys)	75.0
Poultry	7.5

Chart 3.4 below shows the distribution of households by the value of additions their livestock. Additions to the herd include births, received as gift/payment, but exclude any purchases as these are covered in the section on cash income above.

Of all households 9% (13) had no additions to their livestock during the survey period and 28% (41) had additions valued at between 1 and 500 dollars. The rest of the distribution is flat and elongated with 8% of households (11) having additions valued at over N$ 6 000.

Chart B3.4 Distribution of households by value of additions to livestock

Value	No. hh's
0	13
1-500	41
501-1000	18
1001-1500	10
1501-2000	11
2001-2500	10
2501-3000	4
3001-3500	7
3501-4000	6
4001-4500	7
4501-5000	5
5001-5500	1
5501-6000	2
> 6000	11
	146

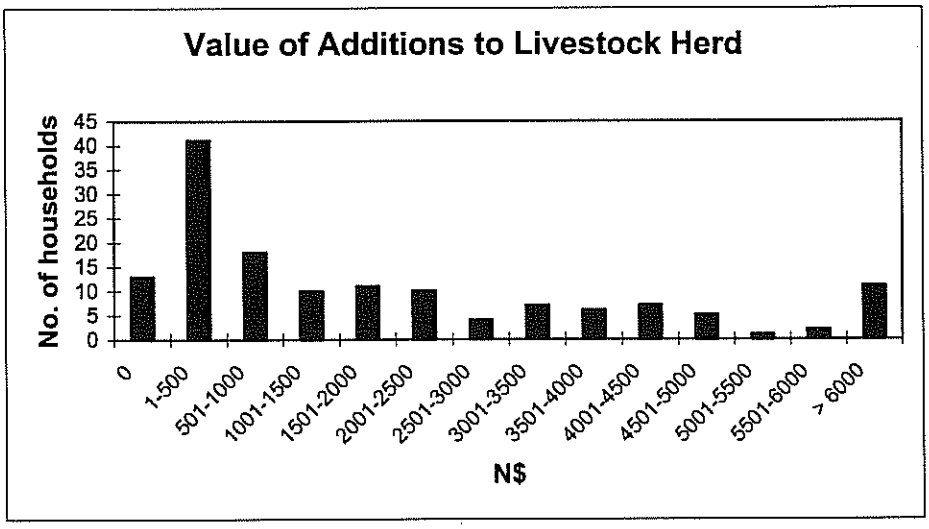
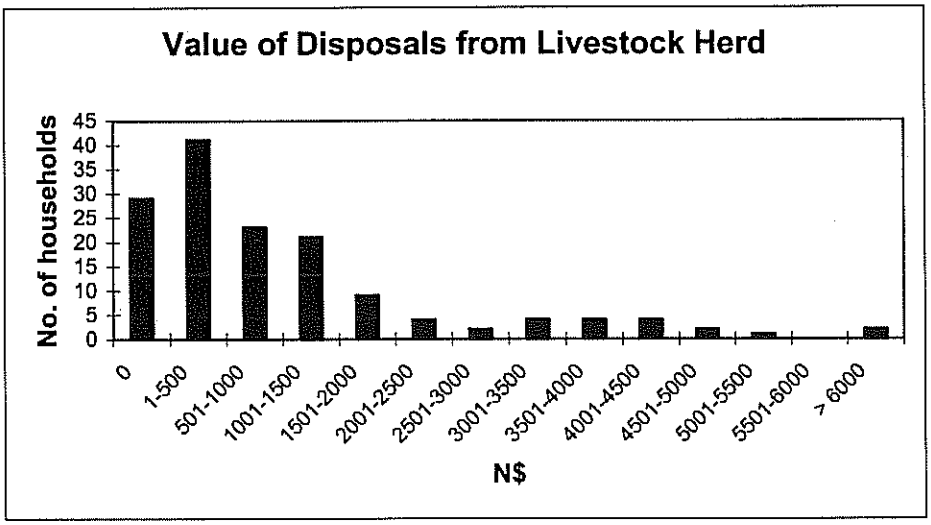


Chart 3.5 below shows the distribution of households by the value of disposals from their livestock. Disposals from the herd include deaths, livestock given away, lost, used for feasts, and paid as fines, but exclude any sales or own consumption as these are covered in earlier sections.

Of all households 20% (29) had no disposals during the reporting period and 58% (85) households had disposals valued at between1 and 1 500 dollars.

Chart B3.5 Distribution of households by value of disposals of livestock

Value	No. hh's
0	29
1-500	41
501-1000	23
1001-1500	21
1501-2000	9
2001-2500	4
2501-3000	2
3001-3500	4
3501-4000	4
4001-4500	4
4501-5000	2
5001-5500	1
5501-6000	0
> 6000	2
	146



B 4 Non-crop Welfare Gains

B 4.1 Non-crop (cash & cattle) Welfare Gain/loss

In sections B1 to B 3 above we looked at various aspects of a household's welfare from cash income to change in livestock value. By combining this data cash income/expenditure with the value of own consumption and changes in stock value we can build an indicator of the welfare status of a household. While such an indicator is not complete, the value of some bartered goods and hunting/gathering activities are missing, it should serve as a sufficient means for assessing the welfare status of households. This idea will be taken further in the comparative analyses of Section E later. There are concerns about using such an indicator as a measure of welfare status, for instance the cash income for Kalembeza appears low, as mentioned earlier in Section B 1.2. Hence, other welfare measures will also be used to differentiate between better off and less well off households later in this report.

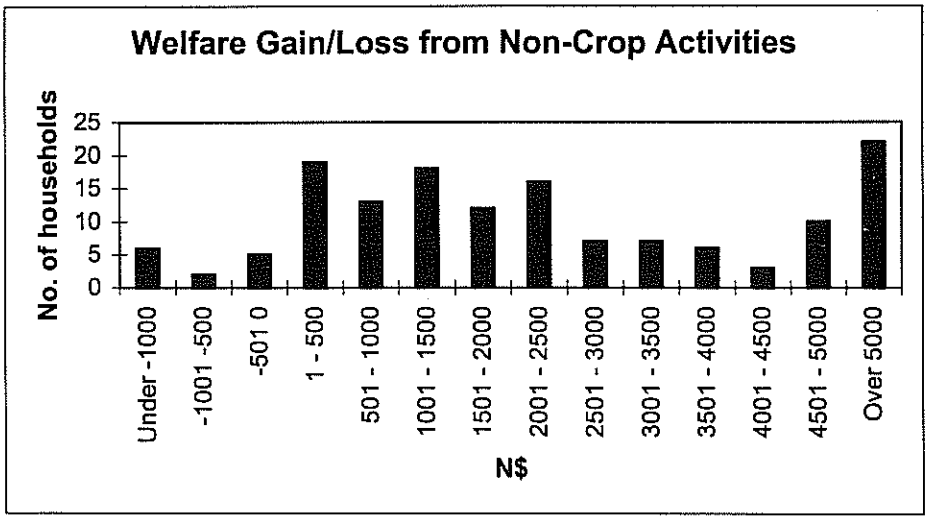
An indicator of welfare status has been derived as follows:

Welfare Status = (Cash Income + Own Consumption + Value of Livestock Additions)
– (Cash Expenditure + Value of Livestock Disposals)

Chart B 4.1 below shows the distribution of households by net welfare status. Of all households 9 % (13) had a welfare status value of zero or less with just over half (53 % or 78) were in the range 1 to 2 500 dollars. A large proportion of households (15% or 22) had a welfare status value of over N$ 5 000.

Chart B4.1 Distribution of households by net welfare status.

Gain/loss	*No. hh's*
Under -1000	6
-1001 -500	2
-501 0	5
1 - 500	19
501 - 1000	13
1001 - 1500	18
1501 - 2000	12
2001 - 2500	16
2501 - 3000	7
3001 - 3500	7
3501 - 4000	6
4001 - 4500	3
4501 - 5000	10
Over 5000	22
	146



Part C Crop Production

C 1 Crop Areas

Table C1.1 below shows the number of cultivated plots and the type of crop growing on them for the different villages. Overall 58% of plots were planted with maize (either as pure stand or as part of a crop mixture), 39% with sorghum and 21% with mahangu. Other crops planted were melon (17% - mostly in Batubaja, 59% of plots), sugarcane (7% - mostly in Masokotwane, 32% of plots) and pumpkin (6% - mostly in Batubaja, 19% of plots). Sunflower was planted in Muyako on only one plot.

Table C1.1 Cultivated plots by type of crop growing

Number of cultivated plots by type of crop growing.

Crop	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Mahangu/Millet - Traditional	6	21	4	20	23	3	77
Sorghum - Traditional	29	31	10	23	32	17	142
Maize - Traditional	36	40	39	33	26	35	209
Maize - Improved	0	0	0	0	0	1	1
Maize - Mixed	1	0	0	0	0	0	1
Unknown	1	0	0	0	0	0	1
Pumpkins	13	4	1	2	2	0	22
Melons	40	7	0	3	10	0	60
Sugar cane	0	1	2	2	18	4	27
Sunflower	0	0	0	0	0	1	1
Other	0	0	0	0	10	0	10
Number of plots	68	65	46	74	56	52	361

Percentage of cultivated plots by type of crop growing.

Crop	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Mahango/Millet - Traditional	9	32	9	27	41	6	21
Sorghum - Traditional	43	48	22	31	57	33	39
Maize - Traditional	53	62	85	45	46	67	58
Maize - Improved	0	0	0	0	0	2	0
Maize - Mixed	1	0	0	0	0	0	0
Unknown	1	0	0	0	0	0	0
Pumpkins	19	6	2	3	4	0	6
Melons	59	11	0	4	18	0	17
Sugar cane	0	2	4	3	32	8	7
Sunflower	0	0	0	0	0	2	0
Other	0	0	0	0	18	0	3

In Table C1.2 the percentage of plots by village and number of crops per plot is given. Mixed cropping was not commonly used as 63% of the plots had only one crop planted. An additional 24% of plots had two crops planted. Masokotwane used mixed cropping the most, with up to six different crops per plot.

Table C1.2 Percentage of plots by crops growing

Percentage of plots by number of crops growing

No. of crops	Batubaja	Kalembeza	Lusese	Makanga	Masokotwane	Muyako	All
1	30	47	77	93	46	85	63
2	55	38	23	4	13	13	24
3	14	11	0	3	24	2	9
4	0	4	0	0	11	0	2
5	0	0	0	0	2	0	0
6	0	0	0	0	4	0	1
All	100	100	100	100	100	100	100

Percentage of plots by number of major crops growing.

No.of major crops	Batubaja	Kalembeza	Lusese	Makanga	Masokotwane	Muyako	All
0	0	4	0	0	0	11	2
1	94	56	81	97	67	81	80
2	6	31	19	3	22	6	14
3	0	9	0	0	11	2	4
All	100	100	100	100	100	100	100

On most of the plots (80%) only one major crop (maize, sorghum or mahangu) was planted. Masokotwane, Kalembeza and Lussese recorded higher than the average percentage of plots with more than one major crop.

Crop area information was collected on a plot basis (see the introduction for a definition of a plot). Where mixed crops were grown within a plot a main crop was allocated to the plot and any additional crops grown on the fields were noted as secondary crops. Enumerators visited each plot and allocated a main crop on the basis of eye estimates of the density of each crop. However, where crops have been planted in a mixture within a plot it is very difficult to allocate areas to each of the crops within a mixed plot. However, if we consider only the three major crops (Maize, Sorghum and Mahangu) an estimate of the area under these major crops can be obtained. Using data on the area planted to each major crop obtained from the 1996/97 Agricultural Production Survey (Central Bureau of Statistics), the plot area can be allocated to each major crop on a proportion basis and a total area estimated. These estimates are presented in Table C1.3 below. We should note that only 18 % of plots had more than one major crop growing on them see Table C1.2 above.

From Table C1.3 below, maize and sorghum are the dominant crops. 94% of households (137) planted some maize and 73% planted sorghum (106), while only 45% planted mahangu (65). Very few households reported using the improved seed type.

Table C1.3 Households Growing Major Crops

No of Growers of major crops

	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
No. of Growers	29	27	17	27	21	24	145
Mahangu Traditional	6	19	4	18	16	2	65
Mahangu Improved	0	0	0	0	0	0	0
Mahangu Mixed	0	0	0	0	0	0	0
Sorghum Traditional	23	24	7	18	20	14	106
Sorghum Improved	0	0	0	0	0	0	0
Sorghum Mixed	0	0	0	0	0	0	0
Maize Traditional	28	23	17	27	20	22	137
Maize Improved	1	0	0	0	0	0	1
Maize Mixed	1	0	0	0	0	0	1
Crop Unknown	1	1	0	0	0	0	2

Table C1.4 below shows that of the total area planted (540.31 hectares) over half (54%) was planted with maize (291.78 hectares, traditional + improved + mixed), 35% with sorghum (186.49 hectares) and 12% with mahangu (63.09 hectares). The total area planted in Muyako makes out just over one quarter (27%) of the total area planted in the six different villages. Several plots in Muyako were larger than the average (see Table C1.5 below), which could be explained by the close proximity of the village to the Lake Liambezi area.

Table C1.4 Total Area in hectares and Proportion of Area under Major Crops

Total Area

	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Total Area	86.77	74.81	59.23	104.73	66.95	147.82	540.31
Mahangu Traditional	4.91	16.92	0.87	25.42	14.60	0.38	63.09
Mahangu Improved	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mahangu Mixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sorghum Traditional	36.53	38.05	4.95	32.39	31.29	43.29	186.49
Sorghum Improved	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sorghum Mixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maize Traditional	42.45	19.85	53.42	46.92	21.06	104.15	287.84
Maize Improved	0.00	0.00	0.00	0.00	0.00	0.94	0.94
Maize Mixed	3.00	0.00	0.00	0.00	0.00	0.00	3.00

Proportion of Area

	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Mahangu Traditional	5.66	22.61	1.46	24.27	21.80	0.26	11.68
Mahangu Improved	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mahangu Mixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mahangu	5.66	22.61	1.46	24.27	21.80	0.26	11.68
Sorghum Traditional	42.10	50.86	8.35	30.93	46.73	29.28	34.52
Sorghum Improved	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sorghum Mixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sorghum	42.10	50.86	8.35	30.93	46.73	29.28	34.52
Maize Traditional	48.92	26.53	90.18	44.80	31.46	70.46	53.27
Maize Improved	0.00	0.00	0.00	0.00	0.00	0.64	0.17
Maize Mixed	3.46	0.00	0.00	0.00	0.00	0.00	0.56
Maize	52.38	26.53	90.18	44.80	31.46	71.09	54.00

These results appear to be inconsistent with data from the 1996/97 Agricultural Production Survey (CBS) which reported the following percentages for the area planted under different seed types. It is possible that there was some confusion in the Farm-Household Economic Survey and enumerators did not distinguish between traditional and improved seed types.

Percentage of areas planted to different seed types in the Caprivi region from the CBS 1996/97 Production Survey

	Traditional	Improved	Mixed
Mahangu	49	30	21
Sorghum	83	4	13
Maize	73	13	14

Table C1.5 below reports average areas planted by farmers of each major crop (Maize, Sorghum and Mahangu). As noted earlier, Muyako had a very high average area planted per household of 6.16 hectares, compared to the overall average of 3.73. On average, over the six different villages, a grower of maize plants 2.26 hectares, a grower of sorghum 1.78 hectares and a grower of mahangu 0.97 hectares.

Table C1.5 Average Areas in Hectares per Grower of Major Crops

	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Average Area	2.99	2.77	3.48	3.88	3.19	6.16	3.73
Mahangu Traditional	0.82	0.89	0.22	1.41	0.91	0.19	0.97
Mahangu Improved	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mahangu Mixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mahangu	0.82	0.89	0.22	1.41	0.91	0.19	0.97
Sorghum Traditional	1.59	1.59	0.82	1.80	1.56	3.09	1.78
Sorghum Improved	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sorghum Mixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sorghum	1.59	1.59	0.82	1.80	1.56	3.09	1.78
Maize Traditional	1.52	1.24	3.14	1.74	1.11	4.73	2.23
Maize Improved	0.00	0.00	0.00	0.00	0.00	0.94	0.94
Maize Mixed	3.00	0.00	0.00	0.00	0.00	0.00	3.00
Maize	1.62	1.24	3.14	1.74	1.11	4.78	2.26

C 2 Labour Field Inputs by Households

Time spent on field and other activities is measured in sessions. One session is half a day: a morning period or an afternoon period. If one person spends a morning and an afternoon of the same day on a specific activity, this is counted as one full day, i.e. two sessions. If a group of four people work for two mornings then this is counted as eight sessions.

C 2.1 Labour Inputs by Type of Labour

Over the whole sample 27 117 sessions were spent on field activities, see Table C2.1 below. This gives an average of about 186 sessions per household.

Table C2.1 summarises the number of sessions spent on field activities for different villages by the type of worker and by the type of activity. Household members (77%) did most of the field sessions as opposed to 23% for non-household members. Female workers did more than half (56%) of the sessions, with the exception of Lussese and Muyako. Children younger than 15 years contributed 5% to the time spent on field activities.

Table C2.1 Labour field inputs by type of worker and activity

Percenatge of sessions in field activities by type of worker

	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Total field sessions	6,264	5,559	4,126	5,244	2,566	3,358	27,117
HH member (%)	75	80	70	82	88	69	77
Non-hh member (%	25	20	30	18	12	31	23
Male (%)	46	35	58	36	41	55	44
Female (%)	54	65	42	64	59	45	56
Child <15 yrs (%)	5	3	1	5	6	11	5
Adult (%)	95	97	99	95	94	89	95
Age unkown (%)	0	0	0	0	0	0	0

Number of sessions by field activity

Total field sessions	6,264	5,559	4,126	5,244	2,566	3,358	27,117
Land prep (%)	39	22	19	35	33	23	29
Row planting (%)	3	0	0	7	0	2	3
Broadcasting (%)	7	5	6	1	11	7	6
Replanting (%)	0	0	0	0	1	0	0
Weed/fert (%)	43	29	24	34	38	42	35
Harvest/thresh (%)	5	42	42	23	14	21	25
Other - no draft (%)	2	0	0	0	2	1	1
Other - draft (%)	1	1	8	0	1	4	2

Chart C2.2 Labour inputs to fields by major activities

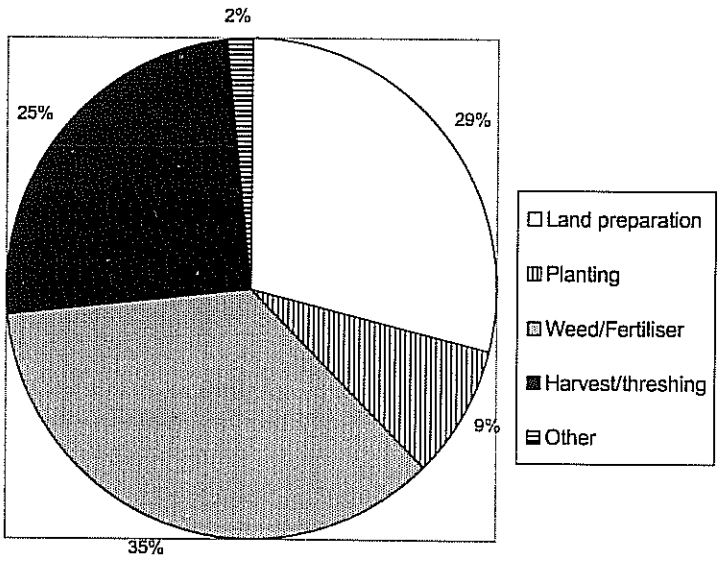


Chart C2.2 above summarises how the sessions were divided between five major activity groupings. Most of the sessions (35%) were spent on weeding/fertilising, 29% on land preparation, 25% on harvesting/threshing and 9% on planting.

Table C2.3 below breaks down the data given in Table C2.1 above by sub-dividing the data further into six major activity groupings.

Table C2.3 Labour inputs by activity and worker type

	Batubaja	Kalembeza	Lusese	Makanga	Masokotwane	Muyako	All
Total land preparartion	2428	1214	773	1816	858	771	7860
Hh member (%)	61	84	37	77	74	67	68
Non hh member (%)	39	16	63	23	26	33	32
Male (%)	75	75	90	73	80	87	78
Female (%)	25	25	10	27	20	13	22
Child <15yrs (%)	8	3	2	10	11	15	8
Adult (%)	92	97	98	90	89	85	92

	Batubaja	Kalembeza	Lusese	Makanga	Masokotwane	Muyako	All
Total row planting	211	26	1	368	1	81	688
Hh member (%)	63	100	100	96	100	85	85
Non hh member (%)	37	0	0	4	0	15	15
Male (%)	3	38	0	9	0	26	10
Female (%)	97	62	100	91	100	74	90
Child <15 yrs (%)	14	0	0	3	100	46	11
Adult (%)	86	100	100	97	0	54	89

	Batubaja	Kalembeza	Lusese	Makanga	Masokotwane	Muyako	All
Total broadcasting	418	297	251	28	276	222	1492
Hh member (%)	65	98	78	93	92	77	81
Non hh member (%)	35	2	22	7	8	23	19
Male (%)	52	7	41	43	17	83	39
Female (%)	48	93	59	57	83	17	61
Child <15yrs (%)	5	0	0	0	8	19	6
Adult (%)	95	100	100	100	92	81	94

Table C2.3 Labour inputs by activity and worker type (Continued)

	Batubaja	Kalembeza	Lusese	Makanga	Masokotwane	Muyako	All
Total replanting	3	27	3	18	26	1	78
Hh member (%)	100	89	100	89	100	100	94
Non hh member (%)	0	11	0	11	0	0	6
Male (%)	0	11	0	11	31	0	17
Female (%)	100	89	100	89	69	100	83
Child <15yrs (%)	0	0	0	17	0	0	4
Adult (%)	100	100	100	83	100	100	96

	Batubaja	Kalembeza	Lusese	Makanga	Masokotwane	Muyako	All
Total weeding/fertiliser	2718	1610	1004	1785	965	1402	9484
Hh member (%)	92	77	80	77	98	61	81
Non hh member (%)	8	23	20	23	2	39	19
Male (%)	24	23	44	21	22	47	29
Female (%)	76	77	56	79	78	53	71
Child <15yrs (%)	1	2	2	3	2	5	2
Adult (%)	99	98	98	97	98	95	98

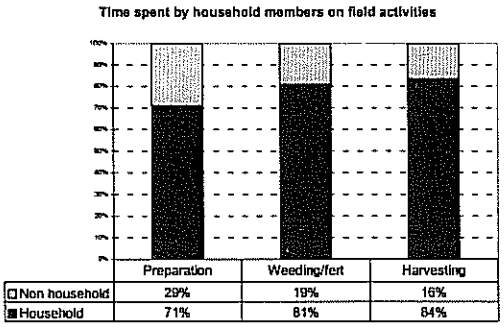
	Batubaja	Kalembeza	Lusese	Makanga	Masokotwane	Muyako	All
Total harvest/thresh	317	2249	1747	1222	358	718	6611
Hh member (%)	75	78	81	94	99	86	84
Non hh member (%)	25	22	19	6	1	14	16
Male (%)	18	26	47	10	8	25	27
Female (%)	82	74	53	90	92	75	73
Child <15yrs (%)	1	4	0	2	0	12	3
Adult (%)	99	96	100	98	100	88	97

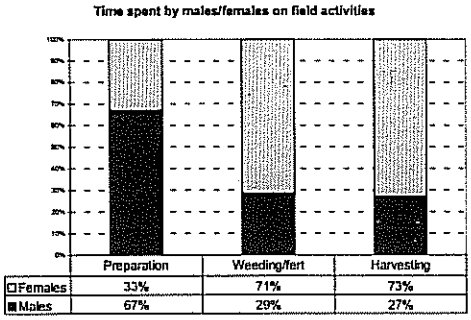
In Table C2.3 the number of sessions on different activities by the different workers are given. Male workers spent more time on land preparation (78%) than females (22%), while females spent more time than males on planting activities (row - 90%, broadcast - 61% and replant - 83%), weeding/fertilisation (71%) and harvesting/threshing (73%).

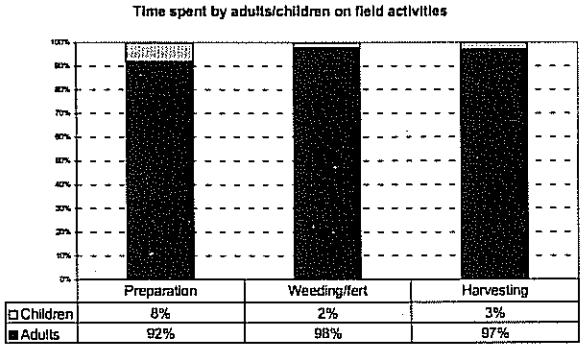
Non-household members do almost a third (32%) of land preparation, for Lussese the proportion is almost two-thirds (63%). Children under the age of 15 are mostly involved in preparation activities (row planting, 11% and land preparation, 8%).

The results from Table C2.3 above are summarised for the three major activities 'Preparation' (land preparation and planting), 'weeding/fertilisation' and harvesting/threshing in Chart 2.4 below.

Chart C2.4 Time spent by different population groupings on field activities







C 3 Draft Power and Equipment Use for Land Preparation

The analysis of draft power use is restricted to that for land preparation, since draft power is almost never used for any other crop production activity.

C 3.1 Methods of Land Preparation

Table C3.1 shows that on 89% of the area cultivated (the sum of 48%, 39%, and 2%); oxen were used for land preparation, either alone or in combination with hand/tractors (there were no donkeys recorded in Caprivi). Oxen were mainly used alone (48% of the area prepared). However, the mix of oxen/hand preparation varies considerably between villages. In Muyako 67% of land was prepared by oxen alone while only 13% in Batubaja. Only 10% of the total area was prepared by hand alone and tractors were used on only 1% of the prepared area.

The table on percentage of households shows much the same pattern as the area percentage. A small percentage of households (19%) prepared their fields only by hand. The tendency is to use oxen alone or in combination with hand preparation. Although tractors were used in three different villages Muyako, Masokotwane and Kalembeza, only a small percentage of households made use of them.

Table C3.1 Methods of land preparation

Percent of area prepared using different land preparation methods

Method of Preparation	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Hand alone	9	9	7	6	3	18	10
Oxen/donkey							
Alone	13	52	91	31	37	67	48
With Hand	78	28	2	63	54	13	39
With Tractor	0	10	0	0	0	2	2
Tractor							
Alone	0	1	0	0	5	0	1
With hand	0	0	0	0	2	0	0
All	0	0	0	0	0	0	0

Percent of households using different land preparation methods on at least one plot

Method of Preparation	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Hand alone	24	22	6	26	14	14	19
Oxen/donkey							
Alone	38	56	88	63	67	82	63
With Hand	83	67	18	85	52	23	59
With Tractor	0	4	0	0	0	5	1
Tractor							
Alone	0	4	0	0	5	5	2
With hand	0	0	0	0	5	0	1
All	0	0	0	0	0	0	0

C 3.2 Type and Number of Equipment Used for Oxen Ploughing

Single ploughs were used to prepare 84% of the area (Table C3.2). The remaining 16% of the area were prepared with two ploughs.

The single furrow plough was the dominant equipment used with 96% of households (140) using it at least once during the survey period. Overall 57% households (83) used sledges. Households used very little other equipment with the exception of Lussese where 94% (16) of households used a bush harrow.

Table C3.2 Number of equipment used for oxen ploughing

Number of ploughs used for ox/donkey cultivation - % of area

	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Number of ploughs							
One	83	100	99	83	100	61	84
Two	17	0	1	17	0	39	16
More than 2	0	0	0	0	0	0	0

Number of households using equipment for draft use at least once during the survey

Equipment used	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Single furrow plough	28	27	16	27	20	22	140
Disk plough	0	0	0	0	2	3	5
Bush harrow	1	2	16	0	0	0	19
Sledge	20	12	17	0	13	21	83
Oxen cart	0	0	0	0	0	2	2
Tractor	0	6	0	0	0	1	7
Other	2	0	0	0	1	8	11

C 3.3 Ownership of Equipment and Oxen for Ploughing

Table C3.3 shows that on 67% of the area cultivated households used their own equipment. On 15% of the area, equipment owned by relatives was used for ox cultivation and only 2% of the area was cultivated with hired equipment. Overall on 17% of the total area a mixture of equipment was used, either owned, owned by relatives or hired. No cases of co-ownership of equipment were recorded during the survey.

Table C3.3 Ownership of equipment used for ploughing

Ownership of equipment used for ox/donkey cultivation - % of area

	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Owwnership of equipment							
No equipment used	0	0	0	0	0	0	0
Owned	60	54	69	60	57	87	67
Co-owned	0	0	0	0	0	0	0
Relative	18	38	7	18	11	2	15
Hired	3	0	0	0	12	0	2
Other	0	0	0	0	0	0	0
Mixed	20	8	24	22	20	10	17

Table C3.3 Ownership of equipment used for ploughing (continued)

Ownership of equipment used with oxen/donkey for ploughing - percent of households

Owwnership of equipment	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
No equipment used	0	0	0	0	0	0	0
Owned	50	42	50	63	40	81	54
Co-owned	0	0	0	0	0	0	0
Relative	39	58	25	22	40	10	33
Hired	11	0	0	0	10	5	4
Other	0	0	0	0	0	0	0
Mixed	32	17	44	33	20	19	27

More than half of the households (54%) prepared their fields with own equipment and only 4% hired equipment. Over a third of households (33%) obtained equipment from a relative.

In Table C 3.4 below, more than half of the area (54%) was ploughed with own cattle and 27% of the area was ploughed with a mixture of oxen, some of which were owned and some hired or borrowed. Only 3% of the area were cultivated with cattle that were hired.

Table C3.4 Ownership of draft power used for ploughing

Ownership of oxen/donkey used ploughing - percent of area

Ownership of oxen/donkey	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Owned	57	41	50	50	54	65	54
Hired	3	0	0	3	12	1	3
Borrowed	21	32	14	20	11	4	16
Combination	20	26	36	26	23	31	27

Ownership of oxen/donkey used for ploughing - percent of households

Ownership of oxen/donkey	Batubaja	Kalembeza	Lussese	Makanga	Masokotwane	Muyako	All
Owned	43	46	31	59	35	71	49
Hired	11	0	6	4	10	10	7
Borrowed	43	46	44	26	40	5	34
Combination	25	29	63	41	20	38	35

Just below half of the households (49%) ploughed with their own oxen and above one-third (34%) borrowed oxen. Around 7% hired oxen for ploughing over all villages except for Kalembeza where households did not hire any oxen for ploughing.

C 4 Seed Use and Source of Supply

Seed was the main material crop input. Only two households applied fertiliser both in Makanga using a total of 12 kg.

C 4.1 Seed Source

The main source of seed is own retained from previous harvest (82% of the seed), see Table C4.1. Farmers also used seed received from another farmer (8%) with Muyako recording 29%, well above average. The pattern for households using seeds from the second part of Table C4.1 below is very similar to that seen in the amount of seed use.

Table C4.1 Seed source of supply

Seed source - Percent of amount (kgs)

	Batubaja	Kalembeza	Lusese	Makanga	Masokotwane	Muyako	All
Own retained from previous season	75	76	96	90	96	59	82
Relative	13	10	1	10	2	2	6
Other farmer	2	14	0	0	2	29	8
NGO	0	0	0	0	0	0	0
Extension programme	8	0	3	0	0	2	2
Store/coop	0	0	0	0	0	3	1
Ndc	1	0	0	0	0	5	1
Grand Total	100	100	100	100	100	100	100

Seed source - Percent of households

	Batubaja	Kalembeza	Lusese	Makanga	Masokotwane	Muyako	All
Own retained from previous season	69	69	95	97	96	63	81
Relative	20	20	3	3	1	3	8
Other farmer	5	12	1	0	3	22	7
NGO	1	0	0	0	0	0	0
Extension programme	5	0	2	0	0	3	2
Store/coop	0	0	0	0	0	8	1
NDC	1	0	0	0	0	2	0
Grand Total	100	100	100	100	100	100	100

C 4.2 Seed Type

Most households (97%) used the local seed varieties and only 3% used improved varieties, mainly in Muyako. Farmers also tend not to use a mixture of local and improved varieties. As mentioned earlier these results conflict with the 1996/97 CBS Production Survey.

Table C4.2 Seed type

Seed type - Percent of amount(kgs)

	Batubaja	Kalimbeza	Lusesse	Makanga	Masokotwane	Muyako	All
Local	94	100	100	100	98	88	97
Improved	6	0	0	0	1	12	3
Mixture of local and improved	0	0	0	0	0	0	0

Seed Type - Percent of households

	Batubaja	Kalimbeza	Lusesse	Makanga	Masokotwane	Muyako	All
Local	97	100	100	100	97	87	97
Improved	3	0	0	0	1	13	3
Mixture of local and improved	0	0	0	0	1	0	0

Part D Per Hectare Crop Inputs and Output

Slightly under half (49%) of the cropped area was planted with maize, with 40% and 11% to sorghum and mahangu respectively, see Table C1.4 earlier. Hence, any analysis of per hectare labour input is essentially related to maize and sorghum production, either as single crops or grown in association with other crops.

D 1 Person Sessions per Hectare

Labour and draft inputs were measured as sessions. A session represents either a morning or an afternoon and can be treated as one half of a day's work of one person. Therefore two sessions make up one labour day. The conversion from sessions to labour days is made by dividing by two the number of sessions worked.

However not all activities were undertaken on all plots. Table D1.1 indicates that essentially the activities of planting, weeding and harvesting/threshing were done on most fields (allowing for less than 10% non-reporting). However land preparation by ox ploughing was done on about three quarters of fields (75%) while land clearing was only done on 37.4% of fields and hand hoeing only on 12% of fields.

For each plot its area and the number of sessions worked for each activity was collected. An estimate of the average number of sessions per hectare can then be calculated for each activity by dividing the total sessions worked on that activity by the sum of the areas of the plots on which those sessions were done. However, no attempt was made during data collection to allocate activities to part of a plot. Hence, if part of a plot was prepared by hand-hoe and another part by plough then we do not know how much of the area was prepared by hand-hoe and how much by plough. In order to estimate an average in this case the whole of the plot area is allocated to each activity. This has the effect of under estimating the average number of sessions per hectare. However, the under estimation should not be serious as most activities are done on the whole of a plot. The average number of sessions worked per hectare for different cropping activities are presented in the last column of Table D1.1 below.

Table D1.1 Per hectare labour inputs to crop production

ACTIVITY	% of fields	No. of sessions
Land clearing	38	10.6
Land preparation		
by handhoe	12	3.7
by oxplough	75	12.0
Planting	79	4.8
Weeding	83	18.4
Harvest/threshing	80	13.7

Weeding and harvesting activities require the most labour input per hectare (18.4 and 13.7 sessions respectively), followed by land clearing (10.6 sessions) and ox ploughing (12.0 sessions).

D 2 Seed Inputs per Hectare

The only significant non-labour/draft input used was seed. As reported earlier, the recorded use of improved crops was lower than expected. Hence, seed inputs are not reported by type of seed used.

Table D2.1 Per hectare seed inputs (kg/ha)

Maize	8.1
Sorghum	7.3
Millet	6.6

Table D2.1 shows the seed input rate per hectare by main crop. The data suggest that maize is applied at a higher rate than sorghum and millet. The per hectare seed inputs for sorghum and millet seem to be a bit higher than would be expected (4 kg/ha), while the per hectare seed input for maize is expected to be around 10 kg/ha. For the farm models developed in Part F, per hectare seed inputs of 10 kg/ha for maize and 4 kg/ha for sorghum and millet will be used.

D 3 Yield per Hectare

Yields were estimated in three ways. First farmers were asked to estimate the amount of threshed grain obtained from their plots. Second all off-take from each plot was recorded every two week period. Third a small number of crop cuttings were done on selected plots.

D 3.1 Estimates of Yield from Farmers

Unfortunately, the data collection on farmer estimates of yield was not complete. Some farmers refused to give the information, others did not know their yield. The village of Batubaja refused to give any estimates. The total number of plots recorded by the survey was 339 of which 119 had no information reported on their yield. Of the 262 plots for which a report was recorded, 46 had a yield of zero. Table D3.1 summarises the problems reported by farmers causing zero yields to be recorded. Of the total number of plots (262) where a report was received, 18% (46) were totally destroyed, the main problem being birds, destroying 5% of all reported yield plots.

Table D3.1 Reasons for plots having zero yield

	No. plots	%		
Floods	6	2		
Drought	3	1		
Birds	12	5		
Insects	6	2		
Animals	8	3		
Weeds	7	3		
Late planting	4	2		
TOTAL	46	18	No. of yield plots reported	262

Where plots had more than one crop farmers estimated the amounts of specific grain types obtained from the plot. Over a third of plots (37%) had more than one crop growing on them and 18% of plots had more than one major crop growing on them (see Table C1.2 earlier). In the case where more than one crop was planted on a plot, the area was proportionally allocated to the crops using proportions obtained from CBS's annual agricultural surveys.

Farmer estimates for maize were obtained on a total of 143 plots from 91 households and estimates for mahangu and sorghum on 40 and 79 plots (62 and 30 households) respectively. The distribution of households by farmer estimates of yield for maize are given in Chart D3.2.

Chart D3.2 Distribution of households by farmer estimates of yields per plot for maize

Yields	*HH's*
0	1
1-100	8
101-200	14
201-300	13
301-400	10
401-500	11
501-600	5
601-700	6
> 700	23
	91

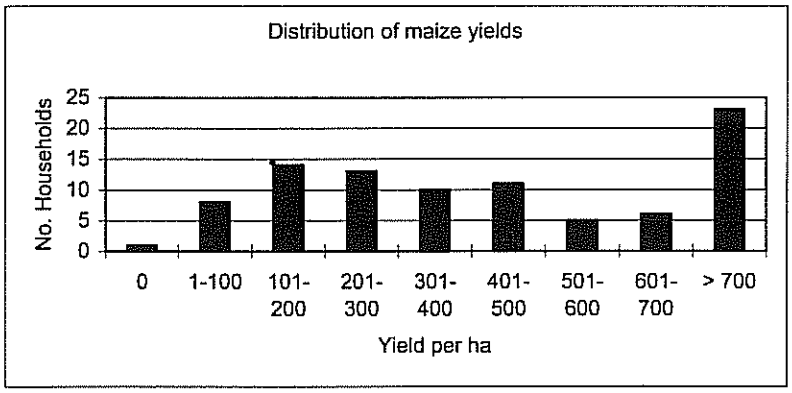


Chart D3.3 Distribution of households by farmer estimates of yields per plot for sorghum

Yields	*HH's*
0	7
1-100	9
101-200	13
201-300	6
301-400	7
401-500	1
501-600	3
601-700	3
> 700	13
	62

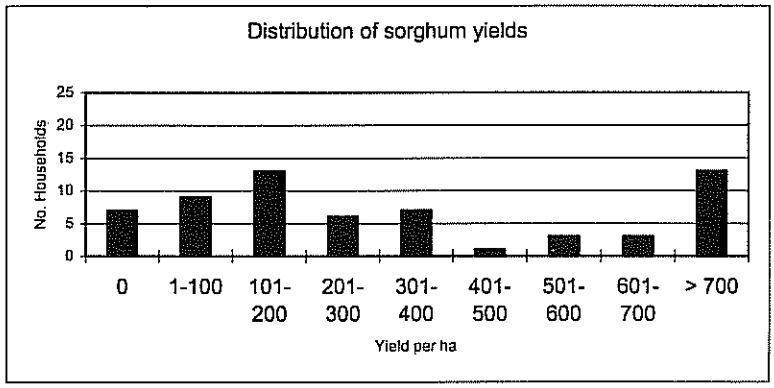


Chart D3.4 Distribution of households by farmer estimates of yields per plot for millet

Yields	*HH's*
0	3
1-100	0
101-200	7
201-300	2
301-400	2
401-500	3
501-600	1
601-700	1
> 700	11
	30

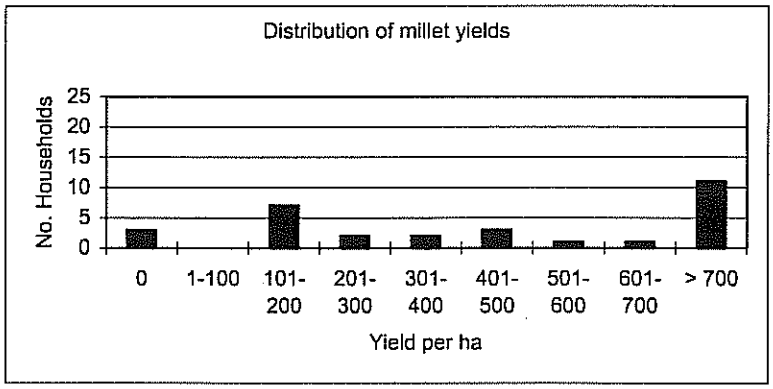


Table D3.5 Farmer estimates of yield by Major crop type

	Farmer estimate
Maize	513
Sorghum	355
Millet	548

The ordering of overall average yields (farmer estimates) per village is as follows:

Lussese	= 1
Masokotwane	= 2
Muyako	= 3
Makanga	= 4
Kalembeza	= 5

D 3.2 Estimates of Yield from Field Off-Take

Every household visit enumerators recorded the harvested taken from each plot over the previous two-week period. This is the recorded off-take and the results for the three major grain crops are given above in table D3.6. Data recorded for other crops such as beans, pumpkins and melons id not included in this report. The reported farmer estimates for maize and millet (Table D3.6 below) are slightly higher than the recorded off-take estimates, while farmer estimates and recorded off-take are almost equal for sorghum. Recorded off-take is expected to be slightly lower due to the fact that not all harvest has been recorded.

Table D3.6 Recorded off-takes kg/ha

	Recorded off-take
Maize	406
Sorghum	354
Millet	441

D 3.3 Estimates of Yield from Crop Cutting

Numerous problems were encountered during crop cutting and only a few estimates were obtained. For maize there were only four observations, sorghum three and mahangu seven observations. Therefore these data have not been included in this report.

Part E Relationships between Household Characteristics, Production Capacity and Performance

E 1 Factors Influencing Area Cropped

It is generally thought that cattle ownership is a major factor influencing crop production, especially in terms of area cultivated. In this section we look at variations in households, their production capacity and performance for three different cattle ownership groups. The survey households were divided into three groups, those owning no cattle, those owning between 1 and 10 cattle and those owning more than 10.

E 2 Relationships between Cattle Numbers and Other Variables

E 2.1 Cattle and Household Characteristics

From Table E2.1 below, 16% of households do not own cattle, 30% own between 1 and 10 head and 53% own over 10 head of cattle. It also shows that as cattle numbers increase the number of producers and dependants, respectively increase. The number of dependants never exceeds the number of producers for each of the three cattle ownership categories. Hence the household size increases across the three groups. However, the dependency ratios remain fairly constant across the three groups.

Table E2.1 Household composition by cattle ownership

	Cattle ownership groups			
	No cattle	1 to 15 head	More than 15	All
Number of households	24	66	56	146
Percentage of households	16	45	38	100
Average number of dependants	2.1	2.4	3.6	2.8
Average number of producers	2.6	3.6	4.6	3.8
Dependency ratio	.8	.7	.8	.7
Average number of non group workers	6.3	7.8	9.5	8.2

E 2.2 Cattle and Non-crop Welfare

In Table E2.2 below, different wealth measures are summarised for each of the cattle ownership groups. The balance between cash income and expenditure grows as cattle numbers increase. For households owning more than 10 heads of cattle the income and expenditure balance is almost three times as much as for households with no cattle. The value of consumption of livestock products also rises as the number of cattle owned rises. For households with more than 10 heads their value of cattle consumption is more than 7 times that of households with no cattle. The non-crop welfare gains for households also increases as the number of owned cattle rises. The number of wage earners for households with cattle is above average, whereas for households with no cattle it is below average.

Table E2.2 Household wealth measures by cattle ownership

	Cattle ownership group			
	No cattle	1 to 15 head	More than 15	All
Cash income and expenditure balance (N$)	672	1039	1932	1321
Consumption of livestock products (N$)	92	297	774	473
Non crop welfare gains (N$)	856	1799	4559	2703
Number of wage earners	.2	.5	.3	.3

E 2.3 Cattle Ownership and Crop Production

Table E2.3 Main crop production by cattle ownership

	Cattle ownership group		
Hectares cultivated	No cattle	1 to 15 head	More than 15
Maize traditional	.8	1.6	2.9
Sorghum traditional	1.1	1.1	1.6
Mahangu traditional	.5	.4	.5
Number of cultivation equipment	2	3	5

The extent of crop area cultivated is strongly related to cattle ownership, Table E2.3 above. The area under production of maize as a main crop tends to increase with cattle ownership. Surprisingly, households with no cattle cultivate larger areas of mahangu/sorghum (1.6 hectares) than households with 1-10 cattle (1.3 hectares). As expected, there also appears to be a relationship between herd size and ownership of cultivation equipment.

E 3 Per Hectare Inputs and Output by Cattle Ownership

Table E3.1 Per hectare labour days by cattle ownership

	Cattle Ownership Group		
	No Cattle	1 to 15 head	More than 15
Hand clearing	7.0	8.1	3.1
Hand hoeing	2.1	1.5	2.3
Ox ploughing	6.7	6.4	5.7
Planting	3.0	2.6	2.2
Weeding	12.3	9.7	8.2
Harvesting	5.3	6.6	6.0

As expected, households with no cattle or small herd sizes have more hand clearing per hectare days, 7.0 and 7.9 labour days per hectare respectively, see Table E3.1, with households with 10 and more head of cattle spending almost half that time, 4.1 labour days. The number of labour days spent on ploughing, planting and harvesting for the three different cattle owning groups do not seem to be vastly different.

Table E3.2 Proportion of sessions supplied by non-household members by cattle ownership

	Cattle ownership group		
	No cattle	1 to 15 head	More than 15
Ox ploughing	43	41	36
Planting	12	16	22
Weeding	12	14	19
Hand hoeing	0	0	25
Harvesting	8	10	19

Non-household members supply high proportions of sessions for ox ploughing for all cattle owners. The large herd owners have need for non-household labour for hand hoeing and harvesting which is presumably related to the larger areas cultivated by these households.

E 4 Per Hectare Grain Yield Estimates By Cattle Ownership Group

Table E4.1 Grain yields – farmer estimates kg/ha

	No Cattle	1 to 15 head	More than 15	Average (Table D4.2)
Maize	281	675	451	513
Sorghum	147	723	239	355
Millet	299	686	456	548

In using the above grain yields by cattle ownership, caution should be applied. There is a big variation in observations across groups and the number of observations within some groups is small and hence the estimates are not very reliable.

Part F Farm Household Models.

F 1 Introduction

As a summary of the farm management information presented in the previous sections, a number of representatives Farm Models are quantified in this final section. The Farm Models mainly focus on cattle ownership of households, but also include part of non-crop gains from cash balances and livestock transactions, which have been summarised as non-crop welfare gains in section B. According to cattle ownership three different categories were distinguished on which the Models are based.

The Models are:

- **Farm Model I** Households without any cattle
- **Farm Model II** Households with between 1 and 15 head of cattle
- **Farm Model III** Households with more than 15 head of cattle

Within models I and II two different variants of the farming model are considered.

For Model I, no cattle owned, the area cultivated is 4.2 hectares and then under the first variant the farmer is not hiring oxen for ploughing while under the second the farmer hires oxen for 50% of his area.

For Model II, 1-15 head of cattle, the area cultivated is 8 hectares and then the variants are the same as for Model I above.

For Model III, 10.6 hectares are cultivated and the farmer is not clearing any new land, no variant is considered for this model.

F 2 Calculations

The formulas used in the three Models are as follows:

Crop Area =
(main crop production, Table E2.3) x (Area proportions, CBS estimates see page 36)

Gross value of production =
((Total crop area for Sorghum/Millet) x (Sorghum/Millet Yield)
x (Sorghum/Millet price))
+ ((Total crop area for Maize) x (Maize Yield) x (Maize price))

Non Household Labour Inputs (Hand hoeing) =
(Total Crop Area) x (Per hectare labour days, Table E3.1)
x (Proportion of sessions supplied by non-household members, Table E3.2).

The same calculation was used for the remaining activities (ox-ploughing, planting, weeding and harvesting).

The Total Non-Household Labour Inputs =

Non-household Labour inputs (ox-ploughing)
+ Non-household Labour inputs (planting)
+ Non-household Labour inputs (weeding)
+ Non-household Labour inputs (harvesting).

Value of Production Net of Cash/Kind costs =

Gross value of production – Non Household labour
– Seed costs – Costs for hiring oxen

Household Labour Inputs (Hand hoeing) =

(Per hectare labour days, Table E3.1)
x (100 – Proportion of sessions supplied by Non Household members, Table E3.2)
x (Total Crop Area)

The same calculation was used for the remaining activities (ox-ploughing, planting, weeding and harvesting).

The Total Household Labour Inputs =

Household Labour inputs (ox- (ploughing) + Household Labour inputs (planting) + Household Labour inputs (weeding) + Household Labour inputs (harvesting).

Value of production Net of Cash/Kind Costs per Household Labour Day =

Value of Production Net of Cash/Kind ÷ Household Labour Day Input

Net Cash, Livestock and Crop Gains (Sept. – June) =

Value of production Net of Cash/Kind Costs
+ Cash balance and value of gains from livestock

Since virtually all the grain produced is consumed, the price used is the price households would have to pay to purchase grain in the village. From data on grain purchases among the survey households this is estimated at N$2 per kg.

Labour inputs are split between household and non-household on the basis of the data in Table E3.2. Crop area data are from Table E2.3. Labour data are taken from Tables E3.1 and E3.2. Oxen hiring costs are as reported by Keyler "Economies of the Pearl Millet Subsector in Northern Namibia ICRISAT 1995: Page 46". A nominal price is included for the cost of non-household labour. Some of this comes from work groups, for which beer has to be made, others come from individuals who may or may not get paid, but will incur a reciprocal arrangement of some kind. Non-household labour of these types is assumed to have an opportunity cost of N$1 per day.

F 3 Model I: No cattle owned

This Model is based on information for households holding no cattle. Two variants are examined. Variant one is where all oxen used for ploughing are borrowed. Variant two is where for half the area oxen are hired, and for the remainder they are borrowed. For these groups it is assumed that no clearing of new fields is done.

Seed costs (N$21.90) are based on the average seed rate of 4kg/ha for Millet/Sorghum and 10kg/ha for Maize and the assumption that farmers purchase seed to plant the area under improved varieties every second year. The rest of the seed is retained own production, which otherwise would have been consumed. Improved seed is priced at N$3 per kg, while retained seed is given the same price as own consumed grain (N$1.5/kg).

The Value of Production Net of Cash/Kind Costs (N$1,617.60) is the Gross Value of Grain Production less Costs of Non-Household Labour and of seed. This represents the Net return to the household labour inputs used for cultivation of the total grain area. Since this Net return is obtained through the input of 55.90 household labour days, we calculate the Net return per household labour day 1,617.60 ÷ 55.9 = N$28.94 per Labour Day supplied by household members.

Table F3.1 Farm Model Type I - No cattle owned

	No hiring		Hire ox plough for 50% area	
	UNITS	N$	UNITS	N$
CROP AREA				
Maize - traditional	0.6		0.6	
Maize - improved	0.2		0.2	
Sorgum - traditional	1.1		1.1	
Sorghum - improved	0.0		0.0	
Millet - traditional	0.4		0.4	
Millet - improved	0.2		0.2	
GROSS VALUE OF PRODUCTION		1,653.0		1,653.0
Yield Millet/Sorghum kg/ha	450.0		450.0	
Yield Maize kg/ha	500.0		500.0	
Price Millet/Sorghum N$/kg	1.5		1.5	
Price Maize N$/kg	1.5		1.5	
NON HOUSEHOLD LABOUR				
@ N$1 per day (N$)	1.0	13.5	1.0	13.5
Hand hoeing	0.0		0.0	
Oxploughing	7.7		7.7	
Planting	0.4		0.4	
Weeding	4.4		4.4	
Harvesting	1.0		1.0	
SEED COSTS		21.9		21.9
Own retained - Millet/Sorghum @ 4kg/ha	1.5	8.9		8.9
Purchased 50% of improved area	3.0	0.9		0.9
Own retained - Maize @10kg/ha	1.5	9.7		9.7
Purchased 50% of improved area	3.0	2.4		2.4
OXEN HIRE FOR PLOUGHING		0.0		490.9
N$/ha	416.0		416.0	
VALUE OF PRODUCTION NET OF CASH/KIND COSTS		1617.6		1126.7
HOUSEHOLD LABOUR INPUTS (days)	55.9		55.9	
Hand hoeing	5.0		5.0	
Oxploughing	8.1		8.1	
Planting	6.7		6.7	
Weeding	24.7		24.7	
Harvesting	11.5		11.5	
VALUE OF PRODUCTION NET OF CASH/KIND COSTS PER HOUSEHOLD LABOUR DAY (N$/day)		29.0		20.2

The budgets in Table F3.1 indicate that in the 1996/7 year households with no cattle may typically have achieved returns to their own field labour of N$29 per day, *if they did not have to hire oxen for ploughing,* and were able to depend on neighbours to borrow the required oxen draught power. However if oxen had to be hired for half the area planted, these households would have achieved a lower return of N$ 20.16 (1,126.7÷55.9) per field labour day on their cropping operations

F 4 Model II: 1 – 15 head of cattle

Table F4.1 Farm Model Type II - 1-15 cattle

	No hiring		Hire ox plough for 50% area	
	UNITS	N$	UNITS	N$
CROP AREA				
Maize - traditional	1.3		1.3	
Maize - improved	0.3		0.3	
Sorgum - traditional	1.1		1.1	
Sorghum - improved	0.0		0.0	
Millet - traditional	0.3		0.3	
Millet - improved	0.1		0.1	
GROSS VALUE OF PRODUCTION		2,212.5		2,212.5
Yield Millet/Sorghum kg/ha	450.0		450.0	
Yield Maize kg/ha	500.0		500.0	
Price Millet/Sorghum N$/kg	1.5		1.5	
Price Maize N$/kg	1.5		1.5	
NON HOUSEHOLD LABOUR @ N$1 per day (N$)	1.0	16.7	1.0	16.7
Hand hoeing	0.0		0.0	
Oxploughing	9.5		9.5	
Planting	1.6		1.6	
Weeding	3.9		3.9	
Harvesting	1.6		1.6	
OXEN HIRE FOR PLOUGHING		0.0		644.8
N$/ha	416.0		416.0	
SEED COSTS		28.4		28.4
- Own retained - Millet/Sorghum @ 4kg/ha	1.5	8.3		8.3
- Purchased 50% of improved area	3.0	0.7		0.7
- Own retained - Maize @ 10kg/ha	1.5	19.4		19.4
- Purchased 50% of improved area	3.0	4.2		4.2
VALUE OF PRODUCTION NET OF CASH/KIND COSTS		2,167.4		1,522.6
HOUSEHOLD LABOUR INPUTS (days)	66.4		66.4	
Hand hoeing	4.7		4.7	
Oxploughing	10.3		10.3	
Planting	6.4		6.4	
Weeding	26.2		26.2	
Harvesting	18.8		18.8	
VALUE OF PRODUCTION NET OF CASH/KIND COSTS PER HOUSEHOLD LABOUR DAY (N$/day)		32.6		22.9

For households with 1-15 head of cattle, two variants are again assumed: one where oxen are hired to plough half the land and the other where no oxen are hired. Similar assumptions about the amount of new land opened up are made as for Model I. Again hiring oxen

dramatically reduces both returns from field labour inputs and combined gains from cash, livestock and crops over the growing season, see Table F4.1.

F 5 Model III: More than 15 head of cattle

For Model III it is assumed that no new land is opened up and therefore no land clearing is needed, the data are presented in Table 5.1 below.

Table F5.1 Farm Model III - Over 15 cattle owned

	No new land cleared	
	UNITS	N$
CROP AREA		
Maize - traditional	2.3	
Maize - improved	0.6	
Sorgum - traditional	1.6	
Sorghum - improved	0.0	
Millet - traditional	0.4	
Millet - improved	0.2	
GROSS VALUE OF PRODUCTION		3,592.5
Yield Millet/Sorghum kg/ha	450.0	
Yield Maize kg/ha	500.0	
Price Millet/Sorghum N$/kg	1.5	
Price Maize N$/kg	1.5	
NON HOUSEHOLD LABOUR		
@ N$1 per day (N$)	1.0	25.0
Hand hoeing (18.65%) (days)	2.2	
Oxploughing (34.78%) (days)	10.0	
Planting (18.96%) (days)	2.1	
Weeding (15.53%) (days)	6.6	
Harvesting (13.52%) (days)	4.2	
OXEN HIRE FOR PLOUGHING		0.0
N$/ha	416.0	
SEED COSTS		53.0
- Own retained - Millet/Sorghum @ 4kg/ha	1.5	11.8
- Purchased 50% of improved area	3.0	0.9
- Own retained - Maize @10kg/ha	1.5	35.1
- Purchased 50% of improved area	3.0	5.3
VALUE OF PRODUCTION NET OF CASH/KIND COSTS		3,514.5
HOUSEHOLD LABOUR INPUTS (days)	96.7	
Hand hoeing (81.35)	9.0	
Oxploughing (65.22%)	18.5	
Planting (81.04%)	8.9	
Weeding (84.47%)	34.4	
Harvesting (86.48%)	25.8	
VALUE OF PRODUCTION NET OF CASH/KIND COSTS PER HOUSEHOLD LABOUR DAY (N$/day)		36.3

F 6 Conclusion

F 6.1 Farm-household productivity indicators

The farm-household economics survey is designed to provide information on the productivity of resource use in the crop based communal farming areas of Namibia. For this purpose information is collected on the major elements of production and on the utilisation of resources (land, labour and capital) in generating this production.

A major part of the survey effort is expended on collecting detailed information on the labour and draft power inputs that households invest in crop production. From these data the first indicator of resource productivity is obtained:

1. R*eturns to family labour time spent in crop production (N$/day)*

The value of inputs other than household labour and draft power is also measured and this allows a second productivity measure:

2. *Gross margin per hectare in crop production (N$/ha)*

However, crop production is only one element of farm-household production. Two other major elements are production from livestock and non-farm cash income. Since the inputs of time into these activities by individual household members are less well defined than for crops a more general productivity indicator is employed. This is the net return to each major element of household production per producer (defined as being between 15 and 59 years of age). This gives the second indicator of resource productivity:

3. *Net value of household production per producer (N$/month).*

Table F6.1 summarises the farm-household production economics situation for households in Caprivi in the 1996/97 season.

Table F6.1 Farm-household productivity indicators

	No Cattle	1 - 15 Head	More than 15
Value of crop production net of cash and kind costs (NVCP)	1,618	2,167	3,514
NVCP per household labour day spent in crop production (N$/day)	29	33	36
NVCP per hectare (N$/hectare)	685	699	703
Production elements: (N$/household)			
Non-farm cash income	1,505	2,008	2,697
Livestock (income, own consumption, inventory change)	253	1,437	4,124
Crops (sales, value of production)	1,621	2,199	3,539
Total household production	3,378	5,644	10,360
Value of Household production per producer (N$/producer)	1,299	1,568	2,252

Non-farm cash income includes all cash earned from sales of fish, firewood, crafts, beer and other non-livestock or crop sales plus all earnings from remittances etc and from services provided. Livestock income is cash earned from sales of livestock, meat and milk/eggs.

F 6.2 Productivity indicator comparisons

In order to assess the productivity of resource use by farm-households in Caprivi some relevant comparisons are made in Table F6.2

Table F6.2 Productivity indicators

	Gross margin/ha	Returns per labour day in cropping	Value of production per producer per month
Caprivi farm-households (N$)			
Model I	685	29	130
Model II	699	33	157
Model III	703	36	225
Dryland commercial maize (N$/ha)	590		
Commercial farm worker wage (N$/day)		10	
Unskilled casual wage employment (N$/day)		25	
Dryland settler scheme income per producer (Omega) (N$/month)			333

This production economics survey suggests that in a good rainfall season farm-households in Caprivi use resources as or more productively than in alternative production situations. Both

gross margins per hectare in grain production and returns to labour employed in crop production are higher in Caprivi farm-households than in comparative situations.

In considering the comparison of value of production per producer it is important to note that not all production has been included for Caprivi farm-households. The own use value of hunting and fishing has been excluded. In addition those in wage employment in urban areas will have additional living costs (housing, fuel) compared to Caprivi rural households.

Of course in a normal rainfall or low rainfall season, the net value of crop production will be much reduced. But it should be noted that the element of crop production accounts for about one third of total household production.

FMS WID

WORKER IDENTIFICATION

Village:	
Household Number:	
Visit Number:	

(A) Worker No	(B) NAME	(C) Date First Recorded	(D) HH Memb Yes=1 No =2	(E) Sex M=1 F=2	(F) Age (Years)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

FMS 1 HOUSEHOLD MEMBERS WORK ACTIVITIES (ON FARM & OFF FARM)

Village:	
Household Number:	
Visit Number:	

Supervisor:	
Date of Enumeration:	
Date Checked:	
Date Entered:	

FMS form	1	2	3	4	5	6	7
No. of lines							

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	
Line	Field Letter	Plot No.	Activity	HH Worker No	Session Worked (M/A/D)	No. Sessions Worked	Work Done For	Paid/Unpaid
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								

FMS 2 ALL DRAFT POWER USED FOR ON AND OFF FARM ACTIVITIES

Village:	
Household Number:	
Visit Number:	

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
Line	Field Letter	Plot No	Activity No	Type of Draft	Number Animals Used	Animals Owned or Hired	Equipment			Session Used M/A/D	No. Sessions Worked
							Type	Number Used	Owned By		
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

FMS 3 NON LABOUR & NON DRAFT INPUTS ON HOUSEHOLD FIELDS

Village:	
Household Number:	
Visit Number:	

	(A)	(B)	(C)	(D)	(E)	(F)
			Input			
Line	Field Letter	Plot No	Type of Input	Type of Unit	Number of Units	Source of Input
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

FMS 4 FIELD OFF-TAKE OF HOUSEHOLD PRODUCE

Village:	
Household Number:	
Visit Number:	

	(A)	(B)	(C)	(D)	(E)
			Crop Off-take		
Line	Field No	Plot No	Crop	Type of Unit	No of Units
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					

FMS 5 HOUSEHOLD LIVESTOCK INVENTORY CHANGES

Village:	
Household Number:	
Visit Number:	

	(A)	(B)	(C)	(D)	(E)	(F)
Line	Reason For Change	Type of Animal	Age Category	Number of Animals	Where Event Occurred	If Died Why
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

FMS 6 HOUSEHOLD CONSUMPTION OF HOUSEHOLD LIVESTOCK PRODUCTS

Village:	
Household Number:	
Visit Number:	

	(A)	(B)	(C)	(D)
Line	Livestock Product	Type of Unit	Number of Units	Cash Equivalent
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

FMS 7

HOUSEHOLD CASH EXPENDITURES AND INCOMES

Village:	
Household Number:	
Visit Number:	

(A) Cash Expenditures	(B)
Type	Amount N$
Food:	
maize meal	
maize grain	
millet grain	
millet meal	
vegetables	
meat	
milk/eggs	
Fish	
Sugar/salt etc	
Other	
Capital items:	
Furniture	
clothes	
Farm equipment	
Other	
Services:	
hire labour	
hire transport	
hire draft	
school	
clinic	
Other	
Loans/Gifts	

(C) Cash Income	(D)
Type	Amount N$
Sale of produce:	
crops	
livestock	
meat	
milk/eggs	
fish	
firewood	
crafts	
beer	
Other	
Services:	
hire labour	
hire transport	
hire draft	
Other	
Earnings:	
remittances	
wages	
pensions	
Other	
Credit/Gifts	

PROCEDURE

A) ASK FOR CASH EXPENDITURES AND INCOMES ONLY

B) TOTAL EXPENDITURES FOR RECALL PERIOD IN THE MAIN CATEGORIES TO NEAREST WHOLE N$

C) USE ITEMS BELOW MAIN CATEGORIES TO PROMPT RECALL

D) CHECK FOR HIRE OF DRAFT FROM FMS 3

FMS 8

HOUSEHOLD CENSUS

Village:	
Household Number:	
Visit Number:	

Supervisor:		
Date of Enumeration:		
Date Checked:		
Date Entered:		

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
Line	Name of Household Member	Worker ID	Sex 1=Male 2=Female	Age (years)	Years of Completed Education	Relationship To HH Head	Main Place of Residence	Wage Earner Yes=1 No=2	Occupation 1	2	3
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

FMS 9 HOUSEHOLD INVENTORY - LIVESTOCK, IMPLEMENTS AND ASSETS

Village:	
Household Number:	
Visit Number:	

Supervisor:	
Date of Enumeration:	
Date Checked:	
Date Entered:	

Count stock/items with the assistance of the farmer and put the number in the appropriate box.

Cattle:	Bulls	
	Oxen	
	Male calves <1 year	
	Female Calves < 1year	
	Tollie (male 1 -3)	
	Heifer	
	Cows	
	Barren Cows	
	Total Cows	
Goats:	Male	
	Female	
	Kids	
	Total Goats	
Pigs:	Boar	
	Sows	
	Piglets	
	Total Pigs	

Poultry:	Chickens	
	Ducks	
	Others	
	Total Poultry	
Donkeys:	Male	
	Female	
	Total Donkeys	
Sheep:	Male	
	Female	
	Lambs	
	Total Sheep	
Mules:	**Total Mules**	
Horses	**Total Horses**	

Farm Equipment:	Number	
	Working	Not Wkg
Tractor		
Furrow Plough		
Disk Plough		
Harrow		
Plough/planter		
Planter		
Ridger plough		
Sledge		
Donkey cart		
Oxen cart		
Wato		
Stirrup Pump		

	Working	Not Wkg
Dwelling units		
Thached roof (num. with)		
Tin roof (num. with)		
Concrete floor (num. with)		
Storage buildings/baskets		
Full storage buildings/baskets		
Radio		
Bicycle		
Watch/clock		
Light Pick-up/car		
Lorry		
Saloon car		
Dover/improved stove		

	Number	
	Working	Not Wkg
Hand hoe		
Machete/panga		
Axe		
Hammer		
Saw		
Rifle		
Shallow well		
Deep well		
Borehole		

FMS10: AREA MEASUREMENT

Date of measurement:..... Enumerator:.....
Village:..... Name of farmer:.....
Household No:..... Field letter:..... Plot number:.....

A: Crop description

Main crop	2nd crop	3rd crop	4th crop	5th crop	6th crop	7th crop	8th crop

B: Field Information

Name of soil type	Field Position (up/down hill, slope, in omuramba, mixed position)	Main crop planted last year	Manure(M) or Fertiliser(F) application: 95 96 97 98 99

Field sketch map

No	Side	Length	Bearing	Antibearin
		Meter	Degrees	Degrees
1	A-B	,		
2	B-C	,		
3	C-D	,		
4	D-E	,		
5	E-F	,		
6	F-G	,		
7	G-H	,		
8	H-I	,		
9	I-J	,		
10	J-K	,		
11	K-L	,		
12	L-M	,		
13	M-N	,		
14	N-O	,		
15	O-P	,		
16	P-Q	,		
17	Q-R	,		
18	R-S	,		
19	S-T	,		
20	T-U	,		
21	U-V	,		
22	V-W	,		
23	W-X	,		
24	-A	,		

Areas to be deducted	
1	,
2	,
3	,
4	,
5	,
6	,
Total	,

Gross Area (ha):	,	Gross Area (ha):	,	+
Closing Error (%):	,	Area Deducted (ha):	,	-
Perimeter (m):		**Planted Area** (ha):	,	=

D: Field Characteristics

1: Age of field or plot

75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99

2: Main crops grown over the last five years

95	96	97	98	99

3: Distance from the household to the field.

1. First option:

Km	Meters

OR

2. Second option:

Hours	Minutes

Date checked by supervisor:.....
Supervisor:.....

FMS11 Rainfall and Temperature

	Supervisor:
Village:	Date of Enumeration:
Household Number:	Date Checked:
Visit Number:	Date Entered:
	Month:

Day	Rainfall (mm)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	

FMS 12 QUARTERLY RECORD OF REGULAR ACTIVITIES and HOURS PER SESSION

Village:	
Household Number:	
Visit Number:	

Supervisor:	
Date of Enumeration:	
Date Checked:	
Date Entered:	

Regular activities:

	(A)	(B)	(C)	(D)
Line	Type of Activity	Who has been doing it	Session Worked M/A	Hours per Session
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

PROCEDURE:

A) **CHECK FOR:** Tending livestock
Fetching water
Fetching firewood
Gathering draft animals

B) **CHECK FOR CROP ACTIVITIES THAT HAVE TAKEN PLACE AND OBTAIN HOURS PER SESSION BY PERIOD OF DAY (M and A)**

FMS 13 **QUARTELY RECORD OF LOCAL PRIZES**

Village:	**Supervisor:**
Household Number:	**Date of Enumeration:**
Visit Number:	**Date Checked by Supervisor:**
	Date Entered into Computer:

For how much on average did you *buy* the following for over the last 3 months:

	Cash price(N$)	In kind(N$)	Mixed
Mahangu grains (price per 1kg)?			
Mahango flour (price per 1 kg)?			
Maize meal (price per 1kg)?			

For how much on average did you *sell* the following for over the last 3 months:

	Cash price(N$)	In kind(N$)	Mixed
Mahangu grains (price per 1kg)?			
Mahango flour (price per 1 kg)?			
Maize meal (price per 1kg)?			

For how much on average did you pay for following for over the last 3 months:

	Cash price(N$)	In kind(N$)	Mixed
Mahango improved seeds (price per kg)?			
Sorgum improved seeds(price per kg)?			
Maize improved seeds (price per kg)?			

How much did you *pay* for hiring the following over the last 3 months:

	Cash price(N$)	In kind(N$)	Mixed
2 oxen for 1 full day?			
2 oxen and a plough for 1 full day?			
2 oxen, a plough and labour for 1 full day?			
1 plough?			

	Cash price(N$)	In kind(N$)	Mixed
Clearing: 1 field worker per plot?			
Weeding: 1 field worker per plot?			
Threshing: 1 field worker per plot?			
Harvesting: 1 field worker per plot?			
Herding: 1 person for for 1 week?			
A cart and animal draft?			

	Cash price(N$)	In kind(N$)	Mixed
Transport per person from the village to nearest town?			
Transport to move goods from the village to nearest town?			

Breeding stock

Did you ***buy*** any young animals(heifers, young cows, etc.) during the last 3 months?	
If yes, how many did you buy?	

	Cash price(N$)	In kind(N$)	Mixed
How much did you pay per head?			

Did you ***sell*** any young animals(heifers, young cows, etc.) during the last 3 months?	
If yes, how many did you sell?	

How much did you get per head?			

Did you ***trade*** any young animals(heifers, young cows, etc.) during the last 3 months?	
If yes, how many?	

What is the cash equivelent per head?			

Prime male animals

Did you ***sell*** any bulls or tollies (4 - 7 years old) during the last 3 months?	
If yes, how many?	

	Cash price(N$)	In kind(N$)	Mixed
How much did you get for them per head?			

Did you ***trade*** any bulls during the last 3 months?	
If yes, how many?	

What is the cash equivelent per head?			

Cull animals

Did you ***dispose*** any old anumals during the last 3 months?	
If yes, how many?	

Goats

Did you ***sell*** any goats during the last 3 months?	
If yes, how many?	

	Cash price(N$)	In kind(N$)	Mixed
How much did you get per goat?			

Did you ***buy*** any goats during the last 3 months?	
If yes, how many?	

	Cash price(N$)	In kind(N$)	Mixed
How much did you pay per goat?			

FMS 14 **Crop cutting**

Enumerator:

Village:

Household:

Sub-plot 1:

Cutting date:	
Field letter:	
Plot number:	

Size of the plot (ha):	
Length (m) of longest side of the plot:	
Half-perimeter (m):	
First random number (*angle*):	
Second random number (*distance into plot*):	

	Crop1	Crop2	Crop3
Name of crop(s) growing on plot:			
Number of ears:			
Wet weight (g):			
Dry weight (g):			
Grain weight (g):			

Sub-plot 2:

Cutting date:	
Field letter:	
Plot number:	

Size of the plot (ha):	
Length (m) of longest side of the plot:	
Half-perimeter (m):	
First random number (*angle*):	
Second random number (*distance into plot*):	

	Crop1	Crop2	Crop3
Name of crop(s) growing on plot:			
Number of ears:			
Wet weight (g):			
Dry weight (g):			
Grain weight (g):			

ISBN 0-86976-487-X

Printed by John Meinert Printing (Pty) Ltd