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
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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

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

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 compared 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

- Epupa rainfall by visit
- Kalemzano rainfall by visit
- Lusese rainfall by visit
- Mikanga rainfall by visit
- Moechovane rainfall by visit
- Munuko rainfall by visit
Chart A1.3 Long-term average rainfall

Rainfall September 96 - June 97

Long term average rainfall (over 50 years)

Rainfall variations over past years

Part A Village and Household Characteristics
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 Kalembeka 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

<table>
<thead>
<tr>
<th>Average age in years</th>
<th>Batubaja</th>
<th>Kalambeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.6</td>
<td>2.7</td>
<td>9.5</td>
<td>8.9</td>
<td>5.3</td>
<td>6.1</td>
<td>6.2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>No. hh's</th>
<th>No. households</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>1-5</td>
<td>72</td>
<td>27</td>
</tr>
<tr>
<td>6-10</td>
<td>55</td>
<td>8</td>
</tr>
<tr>
<td>11-15</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td>16-20</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>21-30</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>31+</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>146</td>
<td>8</td>
</tr>
</tbody>
</table>

Plot cropping histories by village.

<table>
<thead>
<tr>
<th>Batubaja</th>
<th>Kalambeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of plots</td>
<td>69</td>
<td>75</td>
<td>66</td>
<td>77</td>
<td>59</td>
<td>78</td>
</tr>
<tr>
<td>Maize every year for last five years</td>
<td>14</td>
<td>8</td>
<td>27</td>
<td>6</td>
<td>8</td>
<td>26</td>
</tr>
<tr>
<td>% maize</td>
<td>20</td>
<td>11</td>
<td>46</td>
<td>0</td>
<td>14</td>
<td>33</td>
</tr>
<tr>
<td>Millet every year for last five years</td>
<td>2</td>
<td>1</td>
<td>11</td>
<td>14</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>% millet</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>14</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Sorghum every year for last five years</td>
<td>13</td>
<td>5</td>
<td>4</td>
<td>13</td>
<td>7</td>
<td>42</td>
</tr>
<tr>
<td>% sorghum</td>
<td>19</td>
<td>7</td>
<td>7</td>
<td>17</td>
<td>12</td>
<td>54</td>
</tr>
</tbody>
</table>

Percentage of plots with different soil types by village.

<table>
<thead>
<tr>
<th>Batubaja</th>
<th>Kalambeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandy</td>
<td>0</td>
<td>9</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Clay</td>
<td>4</td>
<td>20</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Loam</td>
<td>95</td>
<td>35</td>
<td>57</td>
<td>92</td>
<td>83</td>
<td>63</td>
</tr>
<tr>
<td>Grand Total</td>
<td>69</td>
<td>75</td>
<td>56</td>
<td>77</td>
<td>59</td>
<td>78</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Mascohtwane</th>
<th>Muyako</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average household size</td>
<td>4.8</td>
<td>5.0</td>
<td>6.3</td>
<td>8.2</td>
<td>5.1</td>
<td>9.5</td>
<td>6.7</td>
</tr>
<tr>
<td>Average number hh producers</td>
<td>2.5</td>
<td>4.0</td>
<td>2.9</td>
<td>5.1</td>
<td>2.9</td>
<td>5.2</td>
<td>3.8</td>
</tr>
<tr>
<td>Average number of hh dependants</td>
<td>2.3</td>
<td>2.0</td>
<td>3.4</td>
<td>3.1</td>
<td>2.2</td>
<td>4.3</td>
<td>2.8</td>
</tr>
<tr>
<td>Average dependency ratio</td>
<td>0.9</td>
<td>0.5</td>
<td>1.2</td>
<td>0.5</td>
<td>0.8</td>
<td>0.8</td>
<td>0.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. producers</th>
<th>No hh's</th>
<th>Distribution of producers per household</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>More</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>146</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependency ratio</th>
<th>No hh's</th>
<th>Distribution of dependency ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>More</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>146</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Workers used in field activities</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Mascohtwane</th>
<th>Muyako</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of workers</td>
<td>263</td>
<td>195</td>
<td>126</td>
<td>203</td>
<td>123</td>
<td>270</td>
<td>1210</td>
</tr>
<tr>
<td>Ave. no. of workers/hh</td>
<td>10.1</td>
<td>7.0</td>
<td>7.4</td>
<td>7.5</td>
<td>5.9</td>
<td>11.3</td>
<td>8.3</td>
</tr>
<tr>
<td>In Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of workers</td>
<td>7</td>
<td>45</td>
<td>40</td>
<td>105</td>
<td>0</td>
<td>69</td>
<td>266</td>
</tr>
<tr>
<td>Ave. no. of workers/hh</td>
<td>0.2</td>
<td>1.6</td>
<td>2.4</td>
<td>3.9</td>
<td>0.0</td>
<td>2.9</td>
<td>1.8</td>
</tr>
<tr>
<td>No. of groups used</td>
<td>1</td>
<td>12</td>
<td>5</td>
<td>27</td>
<td>1</td>
<td>12</td>
<td>57</td>
</tr>
<tr>
<td>Ave. no. of workers per group</td>
<td>5.0</td>
<td>3.8</td>
<td>8.0</td>
<td>3.8</td>
<td>0.0</td>
<td>5.8</td>
<td>4.6</td>
</tr>
</tbody>
</table>

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 workgroup 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

<table>
<thead>
<tr>
<th>Sex</th>
<th>Occupation</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Farmer/none</td>
<td>29</td>
<td>39</td>
<td>32</td>
<td>57</td>
<td>33</td>
<td>40</td>
<td>230</td>
</tr>
<tr>
<td></td>
<td>Teacher</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Police/military</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Clerk</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Carpenter</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Driver</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>NGO/Co-op</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Labourer</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Cattle herder</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Student</td>
<td>29</td>
<td>27</td>
<td>24</td>
<td>56</td>
<td>11</td>
<td>56</td>
<td>203</td>
</tr>
<tr>
<td></td>
<td>Retired</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>Male total</td>
<td></td>
<td>64</td>
<td>80</td>
<td>59</td>
<td>119</td>
<td>47</td>
<td>111</td>
<td>480</td>
</tr>
<tr>
<td>Female</td>
<td>Farmer/none</td>
<td>47</td>
<td>48</td>
<td>37</td>
<td>63</td>
<td>37</td>
<td>48</td>
<td>278</td>
</tr>
<tr>
<td></td>
<td>Teacher</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Police/military</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Clerk</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Shopkeeper</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Labourer</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Student</td>
<td>23</td>
<td>28</td>
<td>18</td>
<td>39</td>
<td>15</td>
<td>45</td>
<td>166</td>
</tr>
<tr>
<td></td>
<td>Retired</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Female total</td>
<td></td>
<td>72</td>
<td>87</td>
<td>54</td>
<td>107</td>
<td>52</td>
<td>104</td>
<td>476</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total no. of wage earners</td>
<td>8</td>
<td>14</td>
<td>4</td>
<td>10</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>No. of households reporting</td>
<td>29</td>
<td>28</td>
<td>17</td>
<td>27</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>Households with wage earners</td>
<td>7</td>
<td>10</td>
<td>4</td>
<td>9</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>% households with wage earners</td>
<td>24.1</td>
<td>35.7</td>
<td>23.5</td>
<td>33.3</td>
<td>23.8</td>
<td>16.7</td>
</tr>
</tbody>
</table>
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
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 than 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.
A2.5 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

<table>
<thead>
<tr>
<th>Activity</th>
<th>Average hours done per session</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land preparation</td>
<td>3.4</td>
</tr>
<tr>
<td>Hand hoeing</td>
<td>3.8</td>
</tr>
<tr>
<td>Ploughing - tractor</td>
<td>3.7</td>
</tr>
<tr>
<td>Ploughing - animal draft</td>
<td>4.2</td>
</tr>
<tr>
<td>Planting - hand</td>
<td>4.1</td>
</tr>
<tr>
<td>Weeding - hand</td>
<td>5.7</td>
</tr>
<tr>
<td>Harvesting</td>
<td>5.5</td>
</tr>
<tr>
<td>Threshing</td>
<td>5.5</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Regular Activity</th>
<th>Average hours done per session</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herding cattle</td>
<td>7.6</td>
</tr>
<tr>
<td>Herding smallstock</td>
<td>3.0</td>
</tr>
<tr>
<td>Milking</td>
<td>1.3</td>
</tr>
<tr>
<td>Feeding stock</td>
<td>7.5</td>
</tr>
<tr>
<td>Fetching water</td>
<td>1.3</td>
</tr>
<tr>
<td>Fetching firewood for own use</td>
<td>1.7</td>
</tr>
<tr>
<td>Fetching firewood for sale</td>
<td>1.0</td>
</tr>
<tr>
<td>Gathering draft animals</td>
<td>3.2</td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Expenditure</th>
<th>Sep</th>
<th>Sep</th>
<th>Oct</th>
<th>Oct</th>
<th>Nov</th>
<th>Nov</th>
<th>Dec</th>
<th>Dec</th>
<th>Jan</th>
<th>Jan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Food</strong></td>
<td>119</td>
<td>38</td>
<td>37</td>
<td>48</td>
<td>41</td>
<td>35</td>
<td>52</td>
<td>57</td>
<td>38</td>
<td>35</td>
</tr>
<tr>
<td><strong>Capital</strong></td>
<td>81</td>
<td>25</td>
<td>16</td>
<td>19</td>
<td>9</td>
<td>13</td>
<td>8</td>
<td>50</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>74</td>
<td>26</td>
<td>17</td>
<td>23</td>
<td>18</td>
<td>22</td>
<td>28</td>
<td>42</td>
<td>42</td>
<td>49</td>
</tr>
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<td>3</td>
<td>2</td>
<td>6</td>
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<td>0</td>
<td>1</td>
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<tr>
<td><strong>Income</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Credit</strong></td>
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<td>3</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>39</td>
<td>2</td>
<td>59</td>
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<td>4</td>
</tr>
<tr>
<td><strong>Services</strong></td>
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<td>15</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Earnings</strong></td>
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<td>70</td>
<td>38</td>
<td>111</td>
<td>102</td>
<td>47</td>
<td>37</td>
<td>73</td>
<td>91</td>
<td>68</td>
</tr>
<tr>
<td><strong>Sales</strong></td>
<td>228</td>
<td>41</td>
<td>64</td>
<td>69</td>
<td>42</td>
<td>51</td>
<td>36</td>
<td>148</td>
<td>60</td>
<td>75</td>
</tr>
<tr>
<td><strong>All Expenditure</strong></td>
<td>275</td>
<td>90</td>
<td>70</td>
<td>94</td>
<td>70</td>
<td>75</td>
<td>177</td>
<td>150</td>
<td>100</td>
<td>94</td>
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<tr>
<td><strong>All Income</strong></td>
<td>492</td>
<td>117</td>
<td>107</td>
<td>186</td>
<td>153</td>
<td>139</td>
<td>79</td>
<td>286</td>
<td>185</td>
<td>151</td>
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<thead>
<tr>
<th>Expenditure</th>
<th>Feb</th>
<th>Feb</th>
<th>Mar</th>
<th>Mar</th>
<th>Apr</th>
<th>Apr</th>
<th>May</th>
<th>May</th>
<th>Total</th>
<th>% of all Exp</th>
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<tr>
<td><strong>Food</strong></td>
<td>27</td>
<td>30</td>
<td>33</td>
<td>30</td>
<td>24</td>
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<td><strong>Capital</strong></td>
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<td>10</td>
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<td>9</td>
<td>10</td>
<td>17</td>
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<td>21</td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>42</td>
<td>29</td>
<td>21</td>
<td>19</td>
<td>21</td>
<td>13</td>
<td>16</td>
<td>23</td>
<td>525</td>
<td>31</td>
</tr>
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<td>1</td>
<td>0</td>
<td>3</td>
<td>117</td>
<td>7</td>
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<tr>
<td><strong>Income</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Credit</strong></td>
<td>4</td>
<td>3</td>
<td>6</td>
<td>7</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>181</td>
</tr>
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<td>2</td>
<td>9</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>87</td>
<td>3</td>
</tr>
<tr>
<td><strong>Earnings</strong></td>
<td>15</td>
<td>52</td>
<td>98</td>
<td>287</td>
<td>30</td>
<td>47</td>
<td>20</td>
<td>83</td>
<td>1516</td>
<td>50</td>
</tr>
<tr>
<td><strong>Sales</strong></td>
<td>80</td>
<td>76</td>
<td>56</td>
<td>92</td>
<td>43</td>
<td>31</td>
<td>44</td>
<td>1252</td>
<td>66</td>
<td>1714</td>
</tr>
<tr>
<td><strong>All Expenditure</strong></td>
<td>77</td>
<td>75</td>
<td>67</td>
<td>79</td>
<td>55</td>
<td>49</td>
<td>49</td>
<td>66</td>
<td>3036</td>
<td>41</td>
</tr>
<tr>
<td><strong>All Income</strong></td>
<td>103</td>
<td>134</td>
<td>139</td>
<td>353</td>
<td>126</td>
<td>97</td>
<td>56</td>
<td>133</td>
<td>3036</td>
<td></td>
</tr>
</tbody>
</table>

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 (NS)

<table>
<thead>
<tr>
<th>Sales average income per hh</th>
<th>Batuabaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crops</td>
<td>29</td>
<td>1</td>
<td>15</td>
<td>77</td>
<td>18</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>Livestock</td>
<td>634</td>
<td>638</td>
<td>715</td>
<td>278</td>
<td>218</td>
<td>1420</td>
<td>686</td>
</tr>
<tr>
<td>Meat sales</td>
<td>323</td>
<td>0</td>
<td>41</td>
<td>73</td>
<td>2</td>
<td>206</td>
<td>117</td>
</tr>
<tr>
<td>Milk/eggs sales</td>
<td>8</td>
<td>5</td>
<td>45</td>
<td>0</td>
<td>27</td>
<td>48</td>
<td>20</td>
</tr>
<tr>
<td>Fish sales</td>
<td>0</td>
<td>11</td>
<td>109</td>
<td>0</td>
<td>13</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Firewood</td>
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<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Crafts</td>
<td>9</td>
<td>0</td>
<td>186</td>
<td>1</td>
<td>8</td>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td>Beer</td>
<td>140</td>
<td>130</td>
<td>1254</td>
<td>253</td>
<td>151</td>
<td>46</td>
<td>275</td>
</tr>
<tr>
<td>Other sales</td>
<td>13</td>
<td>63</td>
<td>231</td>
<td>130</td>
<td>64</td>
<td>74</td>
<td>87</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Earnings/Credit Average income per hh</th>
<th>Batuabaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remittances</td>
<td>235</td>
<td>250</td>
<td>414</td>
<td>385</td>
<td>118</td>
<td>359</td>
<td>290</td>
</tr>
<tr>
<td>Wages</td>
<td>324</td>
<td>585</td>
<td>148</td>
<td>417</td>
<td>1007</td>
<td>195</td>
<td>448</td>
</tr>
<tr>
<td>Pensions</td>
<td>449</td>
<td>308</td>
<td>820</td>
<td>1975</td>
<td>472</td>
<td>573</td>
<td>772</td>
</tr>
<tr>
<td>Other earnings</td>
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<td>0</td>
<td>0</td>
<td>22</td>
<td>0</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>inc credit</td>
<td>25</td>
<td>3</td>
<td>29</td>
<td>342</td>
<td>310</td>
<td>302</td>
<td>101</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Services Average income per hh</th>
<th>Batuabaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hire labour</td>
<td>87</td>
<td>70</td>
<td>145</td>
<td>98</td>
<td>87</td>
<td>70</td>
<td>82</td>
</tr>
<tr>
<td>Hire transport</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Hire draft</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Other service income</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

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 (NS)

<table>
<thead>
<tr>
<th>Food average expenditure per hh</th>
<th>Batuabaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize meal</td>
<td>207</td>
<td>420</td>
<td>228</td>
<td>84</td>
<td>152</td>
<td>600</td>
<td>284</td>
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<tr>
<td>Maize grain</td>
<td>21</td>
<td>15</td>
<td>39</td>
<td>0</td>
<td>21</td>
<td>184</td>
<td>45</td>
</tr>
<tr>
<td>Millet grain</td>
<td>32</td>
<td>20</td>
<td>89</td>
<td>0</td>
<td>45</td>
<td>8</td>
<td>29</td>
</tr>
<tr>
<td>Millet meal</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Vegetables</td>
<td>14</td>
<td>16</td>
<td>7</td>
<td>51</td>
<td>14</td>
<td>26</td>
<td>23</td>
</tr>
<tr>
<td>Meat expenditure</td>
<td>150</td>
<td>100</td>
<td>114</td>
<td>161</td>
<td>108</td>
<td>121</td>
<td>127</td>
</tr>
<tr>
<td>Milk/eggs expenditure</td>
<td>13</td>
<td>4</td>
<td>35</td>
<td>2</td>
<td>46</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Fish expenditure</td>
<td>3</td>
<td>43</td>
<td>52</td>
<td>29</td>
<td>17</td>
<td>52</td>
<td>31</td>
</tr>
<tr>
<td>Sugar/salt etc</td>
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<td>97</td>
<td>199</td>
<td>185</td>
<td>79</td>
<td>91</td>
<td>127</td>
</tr>
<tr>
<td>Other food</td>
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<td>38</td>
<td>0</td>
<td>11</td>
<td>33</td>
<td>65</td>
<td>31</td>
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</tbody>
</table>
Table B1.4 Detailed expenditure averages over all households (NS) (Continued)

<table>
<thead>
<tr>
<th>Capital average expenditure per hh</th>
<th>Batubaja</th>
<th>Kalambeza</th>
<th>Lussese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture</td>
<td>28</td>
<td>89</td>
<td>22</td>
<td>30</td>
<td>0</td>
<td>27</td>
<td>35</td>
</tr>
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<td>Clothes</td>
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<td>108</td>
<td>331</td>
<td>188</td>
<td>164</td>
<td>148</td>
<td>162</td>
</tr>
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<td>Farm equipment</td>
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<td>25</td>
<td>21</td>
<td>23</td>
<td>42</td>
<td>20</td>
</tr>
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<td>Other capital items</td>
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<td>4</td>
<td>37</td>
<td>120</td>
<td>169</td>
<td>201</td>
<td>122</td>
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</table>

<table>
<thead>
<tr>
<th>Services/Loans average expenditure per hh</th>
<th>Batubaja</th>
<th>Kalambeza</th>
<th>Lussese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hire labour services</td>
<td>115</td>
<td>94</td>
<td>406</td>
<td>145</td>
<td>85</td>
<td>455</td>
<td>208</td>
</tr>
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<td>Hire transport services</td>
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<td>37</td>
<td>61</td>
<td>128</td>
<td>115</td>
<td>164</td>
<td>95</td>
</tr>
<tr>
<td>Hire draft services</td>
<td>29</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>46</td>
<td>55</td>
<td>24</td>
</tr>
<tr>
<td>School</td>
<td>175</td>
<td>92</td>
<td>189</td>
<td>208</td>
<td>108</td>
<td>163</td>
<td>159</td>
</tr>
<tr>
<td>Clinic</td>
<td>31</td>
<td>8</td>
<td>22</td>
<td>72</td>
<td>20</td>
<td>22</td>
<td>30</td>
</tr>
<tr>
<td>Other service expenditure</td>
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<td>6</td>
<td>1</td>
<td>14</td>
<td>0</td>
<td>7</td>
</tr>
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<td>Expenditure on loans</td>
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<td>27</td>
<td>3</td>
<td>68</td>
<td>65</td>
<td>542</td>
<td>117</td>
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</table>

Table B1.5 below shows the distribution of Income and Expenditure across villages. In Lussese (NS 4 161) and Makanga (NS 4 019) cash income was the highest, while it was the lowest in Kalambeza (NS 2 268) and Batubaja (NS 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 Kalambeza.

Table B1.5 Cash income and expenditure by village

<table>
<thead>
<tr>
<th>Expenditure</th>
<th>Batubaja</th>
<th>Kalambeza</th>
<th>Lussese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>596</td>
<td>40</td>
<td>751</td>
<td>62</td>
<td>769</td>
<td>41</td>
<td>523</td>
</tr>
<tr>
<td>Capital</td>
<td>433</td>
<td>29</td>
<td>202</td>
<td>17</td>
<td>416</td>
<td>22</td>
<td>360</td>
</tr>
<tr>
<td>Services</td>
<td>444</td>
<td>30</td>
<td>231</td>
<td>19</td>
<td>683</td>
<td>37</td>
<td>572</td>
</tr>
<tr>
<td>Loans</td>
<td>1</td>
<td>1</td>
<td>27</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>66</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Income</th>
<th>Batubaja</th>
<th>Kalambeza</th>
<th>Lussese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>28</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>29</td>
<td>1</td>
<td>342</td>
</tr>
<tr>
<td>Capital</td>
<td>92</td>
<td>4</td>
<td>73</td>
<td>3</td>
<td>145</td>
<td>3</td>
<td>64</td>
</tr>
<tr>
<td>Services</td>
<td>1,009</td>
<td>44</td>
<td>1,144</td>
<td>50</td>
<td>1,369</td>
<td>33</td>
<td>2,801</td>
</tr>
<tr>
<td>Earnings</td>
<td>1,155</td>
<td>51</td>
<td>1,049</td>
<td>46</td>
<td>2,597</td>
<td>62</td>
<td>812</td>
</tr>
</tbody>
</table>

The highest expenditure was recorded in Muyako (NS 3 035), much more than the next highest which was recorded in Lussese (NS 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 household’s 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 NS 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

<table>
<thead>
<tr>
<th>Earnings</th>
<th>No. hh's</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>1-500</td>
<td>42</td>
</tr>
<tr>
<td>501-1000</td>
<td>22</td>
</tr>
<tr>
<td>1001-1500</td>
<td>18</td>
</tr>
<tr>
<td>1501-2000</td>
<td>15</td>
</tr>
<tr>
<td>2001-2500</td>
<td>4</td>
</tr>
<tr>
<td>2501-3000</td>
<td>12</td>
</tr>
<tr>
<td>3001-3500</td>
<td>3</td>
</tr>
<tr>
<td>3501-4000</td>
<td>2</td>
</tr>
<tr>
<td>4001-4500</td>
<td>6</td>
</tr>
<tr>
<td>4501-5000</td>
<td>2</td>
</tr>
<tr>
<td>5001 +</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>146</strong></td>
</tr>
</tbody>
</table>

Distribution of Income from earnings
Sept to May 1996/7

<table>
<thead>
<tr>
<th>N$</th>
<th>No. of households</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-500</td>
<td></td>
</tr>
<tr>
<td>501-1000</td>
<td></td>
</tr>
<tr>
<td>1001-1500</td>
<td></td>
</tr>
<tr>
<td>1501-2000</td>
<td></td>
</tr>
<tr>
<td>2001-2500</td>
<td></td>
</tr>
<tr>
<td>2501-3000</td>
<td></td>
</tr>
<tr>
<td>3001-3500</td>
<td></td>
</tr>
<tr>
<td>3501-4000</td>
<td></td>
</tr>
<tr>
<td>4001-4500</td>
<td></td>
</tr>
<tr>
<td>4501-5000</td>
<td></td>
</tr>
<tr>
<td>5001 +</td>
<td></td>
</tr>
</tbody>
</table>

Sales

<table>
<thead>
<tr>
<th>Sales</th>
<th>No. hh's</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>1-500</td>
<td>49</td>
</tr>
<tr>
<td>501-1000</td>
<td>27</td>
</tr>
<tr>
<td>1001-1500</td>
<td>15</td>
</tr>
<tr>
<td>1501-2000</td>
<td>14</td>
</tr>
<tr>
<td>2001-2500</td>
<td>12</td>
</tr>
<tr>
<td>2501-3000</td>
<td>2</td>
</tr>
<tr>
<td>3001-3500</td>
<td>6</td>
</tr>
<tr>
<td>3501-4000</td>
<td>2</td>
</tr>
<tr>
<td>4001-4500</td>
<td>4</td>
</tr>
<tr>
<td>4501-5000</td>
<td>1</td>
</tr>
<tr>
<td>5001 +</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>146</strong></td>
</tr>
</tbody>
</table>

Distribution of Income from sales
Sept to May 1996/7

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

<table>
<thead>
<tr>
<th>Expenditure</th>
<th>No. hh's</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-200</td>
<td>26</td>
</tr>
<tr>
<td>201-400</td>
<td>21</td>
</tr>
<tr>
<td>401-600</td>
<td>22</td>
</tr>
<tr>
<td>601-800</td>
<td>27</td>
</tr>
<tr>
<td>801-1000</td>
<td>19</td>
</tr>
<tr>
<td>1001-1200</td>
<td>7</td>
</tr>
<tr>
<td>1201-1400</td>
<td>9</td>
</tr>
<tr>
<td>1401-1600</td>
<td>7</td>
</tr>
<tr>
<td>1601-1800</td>
<td>2</td>
</tr>
<tr>
<td>1801-2000</td>
<td>1</td>
</tr>
<tr>
<td>2001 +</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>146</strong></td>
</tr>
</tbody>
</table>

Distribution of food expenditures
Sept to May 1996/7
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)

<table>
<thead>
<tr>
<th>Balance</th>
<th>No. hh's</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1000</td>
<td>7</td>
</tr>
<tr>
<td>-500</td>
<td>6</td>
</tr>
<tr>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>500</td>
<td>26</td>
</tr>
<tr>
<td>1000</td>
<td>23</td>
</tr>
<tr>
<td>1500</td>
<td>24</td>
</tr>
<tr>
<td>2000</td>
<td>14</td>
</tr>
<tr>
<td>2500</td>
<td>8</td>
</tr>
<tr>
<td>3000</td>
<td>9</td>
</tr>
<tr>
<td>3500</td>
<td>6</td>
</tr>
<tr>
<td>4000</td>
<td>2</td>
</tr>
<tr>
<td>4500</td>
<td>1</td>
</tr>
<tr>
<td>5000</td>
<td>1</td>
</tr>
<tr>
<td>5001+</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>148</strong></td>
</tr>
</tbody>
</table>

\[
\text{Net cash balances (excluding crop sales)}
\]

\[
\text{No. of households}
\]

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
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 (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 Lusese 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
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

<table>
<thead>
<tr>
<th>Value</th>
<th>No. hh's</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>1-250</td>
<td>52</td>
</tr>
<tr>
<td>251-500</td>
<td>26</td>
</tr>
<tr>
<td>501-750</td>
<td>20</td>
</tr>
<tr>
<td>751-1000</td>
<td>12</td>
</tr>
<tr>
<td>1001-1250</td>
<td>12</td>
</tr>
<tr>
<td>1251-1500</td>
<td>3</td>
</tr>
<tr>
<td>1501-1750</td>
<td>2</td>
</tr>
<tr>
<td>1751-2000</td>
<td>1</td>
</tr>
<tr>
<td>2001-2250</td>
<td>1</td>
</tr>
<tr>
<td>2251-2500</td>
<td>1</td>
</tr>
<tr>
<td>2501-2750</td>
<td>0</td>
</tr>
<tr>
<td>2751-3000</td>
<td>0</td>
</tr>
<tr>
<td>&gt; 3000</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value of Consumption of Own Livestock Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of households</td>
</tr>
<tr>
<td>N$</td>
</tr>
</tbody>
</table>

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.
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.

<table>
<thead>
<tr>
<th>Type of animal</th>
<th>Value in NS per animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>600.0</td>
</tr>
<tr>
<td>Calves</td>
<td>300.0</td>
</tr>
<tr>
<td>Smallstock (including donkeys)</td>
<td>75.0</td>
</tr>
<tr>
<td>Poultry</td>
<td>7.5</td>
</tr>
</tbody>
</table>

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 NS 6 000.
Chart B3.4 Distribution of households by value of additions to livestock

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

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 between 1 and 1 500 dollars.

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

<table>
<thead>
<tr>
<th>Value</th>
<th>No. hh's</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>1-500</td>
<td>41</td>
</tr>
<tr>
<td>501-1000</td>
<td>23</td>
</tr>
<tr>
<td>1001-1500</td>
<td>21</td>
</tr>
<tr>
<td>1501-2000</td>
<td>9</td>
</tr>
<tr>
<td>2001-2500</td>
<td>4</td>
</tr>
<tr>
<td>2501-3000</td>
<td>2</td>
</tr>
<tr>
<td>3001-3500</td>
<td>4</td>
</tr>
<tr>
<td>3501-4000</td>
<td>4</td>
</tr>
<tr>
<td>4001-4500</td>
<td>4</td>
</tr>
<tr>
<td>4501-5000</td>
<td>2</td>
</tr>
<tr>
<td>5001-5500</td>
<td>1</td>
</tr>
<tr>
<td>5501-6000</td>
<td>0</td>
</tr>
<tr>
<td>&gt; 6000</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>146</td>
</tr>
</tbody>
</table>
B 4 Non-crop Welfare Gains

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

In sections B1 to B3 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 Kalambeza 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:

\[
\text{Welfare Status} = (\text{Cash Income} + \text{Own Consumption} + \text{Value of Livestock Additions}) - (\text{Cash Expenditure} + \text{Value of Livestock Disposals})
\]

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.
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.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahangu/Millet - Traditional</td>
<td>6</td>
<td>21</td>
<td>4</td>
<td>20</td>
<td>23</td>
<td>3</td>
<td>77</td>
</tr>
<tr>
<td>Sorghum - Traditional</td>
<td>29</td>
<td>31</td>
<td>10</td>
<td>23</td>
<td>32</td>
<td>17</td>
<td>142</td>
</tr>
<tr>
<td>Maize - Traditional</td>
<td>36</td>
<td>40</td>
<td>39</td>
<td>33</td>
<td>26</td>
<td>35</td>
<td>209</td>
</tr>
<tr>
<td>Maize - Improved</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Maize - Mixed</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Pumpkins</td>
<td>13</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>Melons</td>
<td>40</td>
<td>7</td>
<td>0</td>
<td>3</td>
<td>10</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>Sugar cane</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>18</td>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td>Sunflower</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td><strong>Number of plots</strong></td>
<td><strong>68</strong></td>
<td><strong>65</strong></td>
<td><strong>48</strong></td>
<td><strong>74</strong></td>
<td><strong>56</strong></td>
<td><strong>52</strong></td>
<td><strong>361</strong></td>
</tr>
</tbody>
</table>

Percentage of cultivated plots by type of crop growing.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahangu/Millet - Traditional</td>
<td>9</td>
<td>32</td>
<td>9</td>
<td>27</td>
<td>41</td>
<td>6</td>
<td>21</td>
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<tr>
<td>Sorghum - Traditional</td>
<td>43</td>
<td>48</td>
<td>22</td>
<td>31</td>
<td>57</td>
<td>33</td>
<td>39</td>
</tr>
<tr>
<td>Maize - Traditional</td>
<td>53</td>
<td>62</td>
<td>85</td>
<td>45</td>
<td>46</td>
<td>67</td>
<td>58</td>
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<tr>
<td>Maize - Improved</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Maize - Mixed</td>
<td>1</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>Pumpkins</td>
<td>19</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Melons</td>
<td>59</td>
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<td>4</td>
<td>18</td>
<td>0</td>
<td>17</td>
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<tr>
<td>Sugar cane</td>
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<td>4</td>
<td>3</td>
<td>32</td>
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<td>7</td>
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<td>Sunflower</td>
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<td>0</td>
<td>0</td>
<td>18</td>
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</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>No. of crops</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30</td>
<td>47</td>
<td>77</td>
<td>93</td>
<td>46</td>
<td>85</td>
<td>63</td>
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<tr>
<td>2</td>
<td>55</td>
<td>38</td>
<td>23</td>
<td>4</td>
<td>13</td>
<td>13</td>
<td>24</td>
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<tr>
<td>3</td>
<td>14</td>
<td>11</td>
<td>0</td>
<td>3</td>
<td>24</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
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<td>4</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>0</td>
<td>2</td>
</tr>
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<td>0</td>
<td>0</td>
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<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>All</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Percentage of plots by number of major crops growing.

<table>
<thead>
<tr>
<th>No. of major crops</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>94</td>
<td>56</td>
<td>81</td>
<td>97</td>
<td>67</td>
<td>81</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>31</td>
<td>19</td>
<td>3</td>
<td>22</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>2</td>
<td>4</td>
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<tr>
<td>All</td>
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<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

On most of the plots (80%) only one major crop (maize, sorghum or mahangu) was planted. Masokotwane, Kalembeza and Lusese 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

<table>
<thead>
<tr>
<th>No of Growers of major crops</th>
<th>Batubaja</th>
<th>Kalemb泽za</th>
<th>Lussele</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Growers</td>
<td>29</td>
<td>27</td>
<td>17</td>
<td>27</td>
<td>21</td>
<td>24</td>
<td>145</td>
</tr>
<tr>
<td>Mahangu Traditional</td>
<td>6</td>
<td>19</td>
<td>4</td>
<td>18</td>
<td>16</td>
<td>2</td>
<td>65</td>
</tr>
<tr>
<td>Mahangu Improved</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mahangu Mixed</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sorghum Traditional</td>
<td>23</td>
<td>24</td>
<td>7</td>
<td>18</td>
<td>20</td>
<td>14</td>
<td>106</td>
</tr>
<tr>
<td>Sorghum Improved</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sorghum Mixed</td>
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<td>0</td>
<td>0</td>
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<td>0</td>
</tr>
<tr>
<td>Maize Traditional</td>
<td>28</td>
<td>23</td>
<td>17</td>
<td>27</td>
<td>20</td>
<td>22</td>
<td>137</td>
</tr>
<tr>
<td>Maize Improved</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Maize Mixed</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
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<td>2</td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Total Area</th>
<th>Batubaja</th>
<th>Kalemb泽za</th>
<th>Lussele</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Area</td>
<td>86.77</td>
<td>74.81</td>
<td>59.23</td>
<td>104.73</td>
<td>66.95</td>
<td>147.82</td>
<td>540.31</td>
</tr>
<tr>
<td>Mahangu Traditional</td>
<td>4.91</td>
<td>16.92</td>
<td>0.87</td>
<td>25.42</td>
<td>14.80</td>
<td>0.38</td>
<td>63.09</td>
</tr>
<tr>
<td>Mahangu Improved</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Mahangu Mixed</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Sorghum Traditional</td>
<td>36.53</td>
<td>38.05</td>
<td>4.95</td>
<td>32.39</td>
<td>31.29</td>
<td>43.29</td>
<td>186.49</td>
</tr>
<tr>
<td>Sorghum Improved</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Sorghum Mixed</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Maize Traditional</td>
<td>42.45</td>
<td>19.85</td>
<td>53.42</td>
<td>46.92</td>
<td>21.06</td>
<td>104.15</td>
<td>287.84</td>
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<td>0.00</td>
<td>0.94</td>
<td>0.94</td>
</tr>
<tr>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>3.00</td>
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</table>

<table>
<thead>
<tr>
<th>Proportion of Area</th>
<th>Batubaja</th>
<th>Kalemb泽za</th>
<th>Lussele</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahangu Traditional</td>
<td>5.66</td>
<td>22.61</td>
<td>1.46</td>
<td>24.27</td>
<td>21.80</td>
<td>0.26</td>
<td>11.68</td>
</tr>
<tr>
<td>Mahangu Improved</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Mahangu Mixed</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Mahangu</td>
<td>5.66</td>
<td>22.61</td>
<td>1.46</td>
<td>24.27</td>
<td>21.80</td>
<td>0.26</td>
<td>11.68</td>
</tr>
<tr>
<td>Sorghum Traditional</td>
<td>42.10</td>
<td>50.86</td>
<td>8.35</td>
<td>30.93</td>
<td>46.73</td>
<td>29.28</td>
<td>34.52</td>
</tr>
<tr>
<td>Sorghum Improved</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Sorghum Mixed</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Sorghum</td>
<td>42.10</td>
<td>50.86</td>
<td>8.35</td>
<td>30.93</td>
<td>46.73</td>
<td>29.28</td>
<td>34.52</td>
</tr>
<tr>
<td>Maize Traditional</td>
<td>48.92</td>
<td>25.53</td>
<td>90.18</td>
<td>44.80</td>
<td>31.46</td>
<td>70.46</td>
<td>53.27</td>
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<td>0.00</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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</tr>
<tr>
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<td>52.38</td>
<td>26.53</td>
<td>90.18</td>
<td>44.80</td>
<td>31.46</td>
<td>71.09</td>
<td>54.00</td>
</tr>
</tbody>
</table>
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**

<table>
<thead>
<tr>
<th></th>
<th>Traditional</th>
<th>Improved</th>
<th>Mixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahangu</td>
<td>49</td>
<td>30</td>
<td>21</td>
</tr>
<tr>
<td>Sorghum</td>
<td>83</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Maize</td>
<td>73</td>
<td>13</td>
<td>14</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Average Area</th>
<th>Batubele</th>
<th>Kalembeza</th>
<th>Lusisse</th>
<th>Makanga</th>
<th>Masokolwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahangu</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional</td>
<td>0.82</td>
<td>0.89</td>
<td>0.22</td>
<td>1.41</td>
<td>0.91</td>
<td>0.19</td>
<td>0.97</td>
</tr>
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<td>Improved</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
</tr>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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</tr>
<tr>
<td>Mahangu</td>
<td>0.82</td>
<td>0.89</td>
<td>0.22</td>
<td>1.41</td>
<td>0.91</td>
<td>0.19</td>
<td>0.97</td>
</tr>
<tr>
<td>Sorghum</td>
<td>1.59</td>
<td>1.59</td>
<td>0.82</td>
<td>1.80</td>
<td>1.56</td>
<td>3.09</td>
<td>1.78</td>
</tr>
<tr>
<td>Traditional</td>
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<td></td>
</tr>
<tr>
<td>Improved</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<td>0.00</td>
<td>0.00</td>
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<td></td>
</tr>
<tr>
<td>Sorghum</td>
<td>1.59</td>
<td>1.59</td>
<td>0.82</td>
<td>1.80</td>
<td>1.56</td>
<td>3.09</td>
<td>1.78</td>
</tr>
<tr>
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<td>1.52</td>
<td>1.24</td>
<td>3.14</td>
<td>1.74</td>
<td>1.11</td>
<td>4.78</td>
<td>2.26</td>
</tr>
<tr>
<td>Traditional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
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<td>Maize</td>
<td>1.62</td>
<td>1.24</td>
<td>3.14</td>
<td>1.74</td>
<td>1.11</td>
<td>4.78</td>
<td>2.26</td>
</tr>
</tbody>
</table>

**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**

<table>
<thead>
<tr>
<th>Total field sessions</th>
<th>Batubala</th>
<th>Kalambezi</th>
<th>Lussese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>HH member (%)</td>
<td>75</td>
<td>80</td>
<td>70</td>
<td>82</td>
<td>88</td>
<td>69</td>
<td>77</td>
</tr>
<tr>
<td>Non-hh member (%)</td>
<td>25</td>
<td>20</td>
<td>30</td>
<td>18</td>
<td>12</td>
<td>31</td>
<td>23</td>
</tr>
<tr>
<td>Male (%)</td>
<td>46</td>
<td>35</td>
<td>58</td>
<td>36</td>
<td>41</td>
<td>55</td>
<td>44</td>
</tr>
<tr>
<td>Female (%)</td>
<td>54</td>
<td>65</td>
<td>42</td>
<td>64</td>
<td>59</td>
<td>45</td>
<td>56</td>
</tr>
<tr>
<td>Child &lt;15 yrs (%)</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>Adult (%)</td>
<td>95</td>
<td>97</td>
<td>99</td>
<td>95</td>
<td>94</td>
<td>89</td>
<td>95</td>
</tr>
<tr>
<td>Age unkown (%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Number of sessions by field activity**

<table>
<thead>
<tr>
<th>Total field sessions</th>
<th>Batubala</th>
<th>Kalambezi</th>
<th>Lussese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land prep (%)</td>
<td>39</td>
<td>22</td>
<td>18</td>
<td>35</td>
<td>33</td>
<td>23</td>
<td>29</td>
</tr>
<tr>
<td>Row planting (%)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Broadcasting (%)</td>
<td>7</td>
<td>5</td>
<td>6</td>
<td>1</td>
<td>11</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Replanting (%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Weed/fert (%)</td>
<td>43</td>
<td>29</td>
<td>24</td>
<td>34</td>
<td>38</td>
<td>42</td>
<td>35</td>
</tr>
<tr>
<td>Harvest/thresh (%)</td>
<td>5</td>
<td>42</td>
<td>42</td>
<td>23</td>
<td>14</td>
<td>21</td>
<td>25</td>
</tr>
<tr>
<td>Other - no draft (%)</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Other - draft (%)</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th></th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total land preparation</strong></td>
<td>2428</td>
<td>1214</td>
<td>773</td>
<td>1816</td>
<td>858</td>
<td>771</td>
<td>7860</td>
</tr>
<tr>
<td>Hh member (%)</td>
<td>61</td>
<td>84</td>
<td>37</td>
<td>77</td>
<td>74</td>
<td>87</td>
<td>88</td>
</tr>
<tr>
<td>Non hh member (%)</td>
<td>39</td>
<td>16</td>
<td>63</td>
<td>23</td>
<td>26</td>
<td>33</td>
<td>32</td>
</tr>
<tr>
<td>Male (%)</td>
<td>75</td>
<td>75</td>
<td>90</td>
<td>73</td>
<td>80</td>
<td>87</td>
<td>78</td>
</tr>
<tr>
<td>Female (%)</td>
<td>25</td>
<td>25</td>
<td>10</td>
<td>27</td>
<td>20</td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td>Child &lt;15 yrs (%)</td>
<td>8</td>
<td>3</td>
<td>2</td>
<td>10</td>
<td>11</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>Adult (%)</td>
<td>92</td>
<td>97</td>
<td>98</td>
<td>90</td>
<td>89</td>
<td>85</td>
<td>92</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total row planting</strong></td>
<td>211</td>
<td>26</td>
<td>1</td>
<td>368</td>
<td>1</td>
<td>81</td>
<td>688</td>
</tr>
<tr>
<td>Hh member (%)</td>
<td>63</td>
<td>100</td>
<td>100</td>
<td>96</td>
<td>100</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>Non hh member (%)</td>
<td>37</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Male (%)</td>
<td>3</td>
<td>38</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>26</td>
<td>10</td>
</tr>
<tr>
<td>Female (%)</td>
<td>97</td>
<td>62</td>
<td>100</td>
<td>91</td>
<td>100</td>
<td>74</td>
<td>90</td>
</tr>
<tr>
<td>Child &lt;15 yrs (%)</td>
<td>14</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>100</td>
<td>46</td>
<td>11</td>
</tr>
<tr>
<td>Adult (%)</td>
<td>86</td>
<td>100</td>
<td>100</td>
<td>97</td>
<td>0</td>
<td>54</td>
<td>89</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total broadcasting</strong></td>
<td>418</td>
<td>297</td>
<td>251</td>
<td>28</td>
<td>276</td>
<td>222</td>
<td>1492</td>
</tr>
<tr>
<td>Hh member (%)</td>
<td>65</td>
<td>98</td>
<td>78</td>
<td>93</td>
<td>92</td>
<td>77</td>
<td>81</td>
</tr>
<tr>
<td>Non hh member (%)</td>
<td>35</td>
<td>2</td>
<td>22</td>
<td>7</td>
<td>8</td>
<td>23</td>
<td>19</td>
</tr>
<tr>
<td>Male (%)</td>
<td>52</td>
<td>7</td>
<td>41</td>
<td>43</td>
<td>17</td>
<td>83</td>
<td>39</td>
</tr>
<tr>
<td>Female (%)</td>
<td>48</td>
<td>93</td>
<td>59</td>
<td>57</td>
<td>83</td>
<td>17</td>
<td>61</td>
</tr>
<tr>
<td>Child &lt;15 yrs (%)</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>19</td>
<td>6</td>
</tr>
<tr>
<td>Adult (%)</td>
<td>95</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>92</td>
<td>81</td>
<td>94</td>
</tr>
</tbody>
</table>
Table C2.3 Labour inputs by activity and worker type (Continued)

<table>
<thead>
<tr>
<th>Total replanting</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hh member (%)</td>
<td>100</td>
<td>89</td>
<td>100</td>
<td>89</td>
<td>100</td>
<td>100</td>
<td>94</td>
</tr>
<tr>
<td>Non hh member (%)</td>
<td>0</td>
<td>11</td>
<td>0</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Male (%)</td>
<td>0</td>
<td>11</td>
<td>0</td>
<td>11</td>
<td>31</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>Female (%)</td>
<td>100</td>
<td>89</td>
<td>100</td>
<td>89</td>
<td>69</td>
<td>100</td>
<td>83</td>
</tr>
<tr>
<td>Child &lt;15yrs (%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>17</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Adult (%)</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>83</td>
<td>100</td>
<td>100</td>
<td>96</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total weeding/fertiliser</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hh member (%)</td>
<td>92</td>
<td>77</td>
<td>80</td>
<td>77</td>
<td>98</td>
<td>61</td>
<td>81</td>
</tr>
<tr>
<td>Non hh member (%)</td>
<td>8</td>
<td>23</td>
<td>20</td>
<td>23</td>
<td>2</td>
<td>39</td>
<td>19</td>
</tr>
<tr>
<td>Male (%)</td>
<td>24</td>
<td>23</td>
<td>44</td>
<td>21</td>
<td>22</td>
<td>47</td>
<td>29</td>
</tr>
<tr>
<td>Female (%)</td>
<td>76</td>
<td>77</td>
<td>56</td>
<td>79</td>
<td>78</td>
<td>53</td>
<td>71</td>
</tr>
<tr>
<td>Child &lt;15yrs (%)</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Adult (%)</td>
<td>99</td>
<td>98</td>
<td>98</td>
<td>97</td>
<td>98</td>
<td>95</td>
<td>98</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total harvest/thresh</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hh member (%)</td>
<td>75</td>
<td>78</td>
<td>81</td>
<td>94</td>
<td>99</td>
<td>86</td>
<td>84</td>
</tr>
<tr>
<td>Non hh member (%)</td>
<td>25</td>
<td>22</td>
<td>19</td>
<td>6</td>
<td>1</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>Male (%)</td>
<td>18</td>
<td>26</td>
<td>47</td>
<td>10</td>
<td>8</td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td>Female (%)</td>
<td>82</td>
<td>74</td>
<td>53</td>
<td>90</td>
<td>92</td>
<td>75</td>
<td>73</td>
</tr>
<tr>
<td>Child &lt;15yrs (%)</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Adult (%)</td>
<td>99</td>
<td>96</td>
<td>100</td>
<td>98</td>
<td>100</td>
<td>88</td>
<td>97</td>
</tr>
</tbody>
</table>

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 Lusese 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

<table>
<thead>
<tr>
<th></th>
<th>Preparation</th>
<th>Weeding/Tot</th>
<th>Harvesting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average household</td>
<td>25%</td>
<td>19%</td>
<td>19%</td>
</tr>
<tr>
<td>Household</td>
<td>25%</td>
<td>19%</td>
<td>19%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Preparation</th>
<th>Weeding/Tot</th>
<th>Harvesting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>33%</td>
<td>21%</td>
<td>27%</td>
</tr>
<tr>
<td>Male</td>
<td>0%</td>
<td>7%</td>
<td>27%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Preparation</th>
<th>Weeding/Tot</th>
<th>Harvesting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults</td>
<td>70%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Children</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Method of Preparation</th>
<th>Batubaja</th>
<th>Kalemebeza</th>
<th>Lusselese</th>
<th>Makaniga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand alone</td>
<td>9</td>
<td>9</td>
<td>7</td>
<td>6</td>
<td>3</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>Oxen/donkey</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alone</td>
<td>13</td>
<td>52</td>
<td>91</td>
<td>31</td>
<td>37</td>
<td>67</td>
<td>48</td>
</tr>
<tr>
<td>With Hand</td>
<td>78</td>
<td>28</td>
<td>2</td>
<td>63</td>
<td>54</td>
<td>13</td>
<td>39</td>
</tr>
<tr>
<td>With Tractor</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Tractor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alone</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>With hand</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>All</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Method of Preparation</th>
<th>Batubaja</th>
<th>Kalemebeza</th>
<th>Lusselese</th>
<th>Makaniga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand alone</td>
<td>24</td>
<td>22</td>
<td>6</td>
<td>26</td>
<td>14</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>Oxen/donkey</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alone</td>
<td>38</td>
<td>56</td>
<td>88</td>
<td>63</td>
<td>67</td>
<td>82</td>
<td>63</td>
</tr>
<tr>
<td>With Hand</td>
<td>83</td>
<td>67</td>
<td>18</td>
<td>85</td>
<td>52</td>
<td>23</td>
<td>59</td>
</tr>
<tr>
<td>With Tractor</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Tractor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alone</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>With hand</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>All</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Number of ploughs</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Mwanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>83</td>
<td>100</td>
<td>99</td>
<td>83</td>
<td>100</td>
<td>61</td>
<td>84</td>
</tr>
<tr>
<td>Two</td>
<td>17</td>
<td>0</td>
<td>1</td>
<td>17</td>
<td>0</td>
<td>39</td>
<td>16</td>
</tr>
<tr>
<td>More than 2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Equipment used</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Mwanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single furrow plough</td>
<td>28</td>
<td>27</td>
<td>16</td>
<td>27</td>
<td>20</td>
<td>22</td>
<td>140</td>
</tr>
<tr>
<td>Disk plough</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Bush harrow</td>
<td>1</td>
<td>2</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>Sledge</td>
<td>20</td>
<td>12</td>
<td>17</td>
<td>0</td>
<td>13</td>
<td>21</td>
<td>83</td>
</tr>
<tr>
<td>Oxen cart</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Tractor</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>8</td>
<td>11</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Ownership of equipment</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Mwanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>No equipment used</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Owned</td>
<td>60</td>
<td>54</td>
<td>69</td>
<td>60</td>
<td>57</td>
<td>87</td>
<td>67</td>
</tr>
<tr>
<td>Co-owned</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Relative</td>
<td>18</td>
<td>38</td>
<td>7</td>
<td>18</td>
<td>11</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Hired</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mixed</td>
<td>20</td>
<td>8</td>
<td>24</td>
<td>22</td>
<td>20</td>
<td>10</td>
<td>17</td>
</tr>
</tbody>
</table>
Table C3.3 Ownership of equipment used for ploughing (continued)

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

<table>
<thead>
<tr>
<th>Ownership of equipment</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lussese</th>
<th>Makanga</th>
<th>Masakotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>No equipment used</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Owned</td>
<td>50</td>
<td>42</td>
<td>50</td>
<td>63</td>
<td>40</td>
<td>81</td>
<td>54</td>
</tr>
<tr>
<td>Co-owned</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Relative</td>
<td>39</td>
<td>58</td>
<td>25</td>
<td>22</td>
<td>40</td>
<td>10</td>
<td>33</td>
</tr>
<tr>
<td>Hired</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mixed</td>
<td>32</td>
<td>17</td>
<td>44</td>
<td>33</td>
<td>20</td>
<td>19</td>
<td>27</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Ownership of oxen/donkey</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lussese</th>
<th>Makanga</th>
<th>Masakotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owned</td>
<td>57</td>
<td>41</td>
<td>50</td>
<td>50</td>
<td>54</td>
<td>65</td>
<td>54</td>
</tr>
<tr>
<td>Hired</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Borrowed</td>
<td>21</td>
<td>32</td>
<td>14</td>
<td>20</td>
<td>11</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Combination</td>
<td>20</td>
<td>26</td>
<td>36</td>
<td>26</td>
<td>23</td>
<td>31</td>
<td>27</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Ownership of oxen/donkey</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lussese</th>
<th>Makanga</th>
<th>Masakotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owned</td>
<td>43</td>
<td>46</td>
<td>31</td>
<td>59</td>
<td>35</td>
<td>71</td>
<td>49</td>
</tr>
<tr>
<td>Hired</td>
<td>11</td>
<td>0</td>
<td>6</td>
<td>4</td>
<td>10</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Borrowed</td>
<td>43</td>
<td>46</td>
<td>44</td>
<td>26</td>
<td>40</td>
<td>5</td>
<td>34</td>
</tr>
<tr>
<td>Combination</td>
<td>25</td>
<td>29</td>
<td>63</td>
<td>41</td>
<td>20</td>
<td>38</td>
<td>35</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Seed source - Percent of amount (kgs)</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own retained from previous season</td>
<td>75</td>
<td>76</td>
<td>96</td>
<td>59</td>
<td>96</td>
<td>59</td>
<td>82</td>
</tr>
<tr>
<td>Relative</td>
<td>13</td>
<td>10</td>
<td>1</td>
<td>10</td>
<td>2</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Other farmer</td>
<td>2</td>
<td>14</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>29</td>
<td>8</td>
</tr>
<tr>
<td>NGO</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Extension programme</td>
<td>8</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Store/coop</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ndc</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Grand Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Seed source - Percent of households

<table>
<thead>
<tr>
<th>Seed source - Percent of households</th>
<th>Batubaja</th>
<th>Kalembeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own retained from previous season</td>
<td>69</td>
<td>69</td>
<td>95</td>
<td>97</td>
<td>96</td>
<td>63</td>
<td>81</td>
</tr>
<tr>
<td>Relative</td>
<td>20</td>
<td>20</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Other farmer</td>
<td>5</td>
<td>12</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>22</td>
<td>7</td>
</tr>
<tr>
<td>NGO</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Extension programme</td>
<td>5</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Store/coop</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>NDC</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Grand Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Seed type - Percent of amount(kgs)</th>
<th>Batubaja</th>
<th>Kalimbeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>94</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>98</td>
<td>88</td>
<td>97</td>
</tr>
<tr>
<td>Improved</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Mixture of local and improved</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Seed Type - Percent of households

<table>
<thead>
<tr>
<th>Seed Type - Percent of households</th>
<th>Batubaja</th>
<th>Kalimbeza</th>
<th>Lusese</th>
<th>Makanga</th>
<th>Masokotwane</th>
<th>Muyako</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>97</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>97</td>
<td>87</td>
<td>97</td>
</tr>
<tr>
<td>Improved</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>Mixture of local and improved</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of fields</th>
<th>No. of sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land clearing</td>
<td>38</td>
<td>10.6</td>
</tr>
<tr>
<td>Land preparation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>by handhoe</td>
<td>12</td>
<td>3.7</td>
</tr>
<tr>
<td>by oxplough</td>
<td>75</td>
<td>12.0</td>
</tr>
<tr>
<td>Planting</td>
<td>79</td>
<td>4.8</td>
</tr>
<tr>
<td>Weeding</td>
<td>83</td>
<td>18.4</td>
</tr>
<tr>
<td>Harvest/threshing</td>
<td>80</td>
<td>13.7</td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Crop</th>
<th>kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>8.1</td>
</tr>
<tr>
<td>Sorghum</td>
<td>7.3</td>
</tr>
<tr>
<td>Millet</td>
<td>6.6</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Reason</th>
<th>No. plots</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floods</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Drought</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Birds</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>Insects</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Animals</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Weeds</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Late planting</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>46</td>
<td>18%</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Yields (kg)</th>
<th>HH's</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1-100</td>
<td>8</td>
</tr>
<tr>
<td>101-200</td>
<td>14</td>
</tr>
<tr>
<td>201-300</td>
<td>13</td>
</tr>
<tr>
<td>301-400</td>
<td>10</td>
</tr>
<tr>
<td>401-500</td>
<td>11</td>
</tr>
<tr>
<td>501-600</td>
<td>5</td>
</tr>
<tr>
<td>601-700</td>
<td>6</td>
</tr>
<tr>
<td>&gt; 700</td>
<td>23</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>91</strong></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Yields (kg)</th>
<th>HH's</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>1-100</td>
<td>9</td>
</tr>
<tr>
<td>101-200</td>
<td>13</td>
</tr>
<tr>
<td>201-300</td>
<td>6</td>
</tr>
<tr>
<td>301-400</td>
<td>7</td>
</tr>
<tr>
<td>401-500</td>
<td>1</td>
</tr>
<tr>
<td>501-600</td>
<td>3</td>
</tr>
<tr>
<td>601-700</td>
<td>3</td>
</tr>
<tr>
<td>&gt; 700</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>62</strong></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Yields (kg)</th>
<th>HH's</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>1-100</td>
<td>0</td>
</tr>
<tr>
<td>101-200</td>
<td>7</td>
</tr>
<tr>
<td>201-300</td>
<td>2</td>
</tr>
<tr>
<td>301-400</td>
<td>2</td>
</tr>
<tr>
<td>401-500</td>
<td>3</td>
</tr>
<tr>
<td>501-600</td>
<td>1</td>
</tr>
<tr>
<td>601-700</td>
<td>1</td>
</tr>
<tr>
<td>&gt; 700</td>
<td>11</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
</tr>
</tbody>
</table>
Table D3.5 Farmer estimates of yield by Major crop type

<table>
<thead>
<tr>
<th>Crop</th>
<th>Farmer estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>513</td>
</tr>
<tr>
<td>Sorghum</td>
<td>355</td>
</tr>
<tr>
<td>Millet</td>
<td>548</td>
</tr>
</tbody>
</table>

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

- Lusseke = 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 is 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

<table>
<thead>
<tr>
<th>Crop</th>
<th>Recorded off-take</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>406</td>
</tr>
<tr>
<td>Sorghum</td>
<td>354</td>
</tr>
<tr>
<td>Millet</td>
<td>441</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Cattle ownership groups</th>
<th>No cattle</th>
<th>1 to 15 head</th>
<th>More than 15</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of households</td>
<td>24</td>
<td>66</td>
<td>56</td>
<td>146</td>
</tr>
<tr>
<td>Percentage of households</td>
<td>16</td>
<td>45</td>
<td>39</td>
<td>100</td>
</tr>
<tr>
<td>Average number of dependants</td>
<td>2.1</td>
<td>2.4</td>
<td>3.6</td>
<td>2.8</td>
</tr>
<tr>
<td>Average number of producers</td>
<td>2.6</td>
<td>3.6</td>
<td>4.6</td>
<td>3.8</td>
</tr>
<tr>
<td>Dependency ratio</td>
<td>.8</td>
<td>.7</td>
<td>.8</td>
<td>.7</td>
</tr>
<tr>
<td>Average number of non group workers</td>
<td>6.3</td>
<td>7.8</td>
<td>9.5</td>
<td>8.2</td>
</tr>
</tbody>
</table>

E 2.2 Cattle and Non-crop Welfare

In Table E2.2 below, different wealth welfare 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 E.2.2 Household wealth measures by cattle ownership

<table>
<thead>
<tr>
<th></th>
<th>Cattle ownership group</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No cattle</td>
<td>1 to 15 head</td>
<td>More than 15</td>
<td>All</td>
<td></td>
</tr>
<tr>
<td>Cash income and expenditure balance (N$)</td>
<td>672</td>
<td>1039</td>
<td>1932</td>
<td>1321</td>
<td></td>
</tr>
<tr>
<td>Consumption of livestock products (N$)</td>
<td>82</td>
<td>287</td>
<td>774</td>
<td>473</td>
<td></td>
</tr>
<tr>
<td>Non crop welfare gains (N$)</td>
<td>856</td>
<td>1799</td>
<td>4559</td>
<td>2703</td>
<td></td>
</tr>
<tr>
<td>Number of wage earners</td>
<td>.2</td>
<td>.5</td>
<td>.3</td>
<td>.3</td>
<td></td>
</tr>
</tbody>
</table>

E 2.3 Cattle Ownership and Crop Production

Table E.2.3 Main crop production by cattle ownership

<table>
<thead>
<tr>
<th>Hectares cultivated</th>
<th>Cattle ownership group</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize traditional</td>
<td>No cattle</td>
<td>1.8</td>
<td>1.6</td>
<td>2.9</td>
</tr>
<tr>
<td>Sorgghum traditional</td>
<td>1.1</td>
<td>1.1</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>Mahangu traditional</td>
<td>.5</td>
<td>.4</td>
<td>.5</td>
<td></td>
</tr>
<tr>
<td>Number of cultivation equipment</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

The extent of crop area cultivated is strongly related to cattle ownership, Table E.2.3 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 E.3.1 Per hectare labour days by cattle ownership

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

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 E.3.1, 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

<table>
<thead>
<tr>
<th></th>
<th>Cattle ownership group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No cattle</td>
</tr>
<tr>
<td>Ox ploughing</td>
<td>43</td>
</tr>
<tr>
<td>Planting</td>
<td>12</td>
</tr>
<tr>
<td>Weeding</td>
<td>12</td>
</tr>
<tr>
<td>Hand hoeing</td>
<td>0</td>
</tr>
<tr>
<td>Harvesting</td>
<td>8</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>No Cattle</th>
<th>1 to 15 head</th>
<th>More than 15</th>
<th>Average (Table D4.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>281</td>
<td>675</td>
<td>451</td>
<td>513</td>
</tr>
<tr>
<td>Sorghum</td>
<td>147</td>
<td>723</td>
<td>239</td>
<td>355</td>
</tr>
<tr>
<td>Millet</td>
<td>299</td>
<td>886</td>
<td>456</td>
<td>548</td>
</tr>
</tbody>
</table>

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)
\[ x (100 – \text{Proportion of sessions supplied by Non Household members, Table E3.2}) \]
\[ x \text{ (Total Crop Area)} \]

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 “Economics 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

<table>
<thead>
<tr>
<th>CROP AREA</th>
<th>No hiring</th>
<th>Hire ox plough for 50% area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UNITS</td>
<td>N$</td>
</tr>
<tr>
<td>Maize - traditional</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Maize - improved</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Sorgum - traditional</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Sorgum - improved</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Millet - traditional</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Millet - improved</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>GROSS VALUE OF PRODUCTION</td>
<td></td>
<td>1,653.0</td>
</tr>
<tr>
<td>Yield Millet/Sorghum kg/ha</td>
<td>450.0</td>
<td>450.0</td>
</tr>
<tr>
<td>Yield Maize kg/ha</td>
<td>500.0</td>
<td>500.0</td>
</tr>
<tr>
<td>Price Millet/Sorghum N$/kg</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Price Maize N$/kg</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>NON HOUSEHOLD LABOUR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>@ N$1 per day (N$)</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Hand hoeing</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Oxploughing</td>
<td>7.7</td>
<td>7.7</td>
</tr>
<tr>
<td>Planting</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Weeding</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Harvesting</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>SEED COSTS</td>
<td></td>
<td>21.9</td>
</tr>
<tr>
<td>Own retained - Millet/Sorghum @ 4kg/ha</td>
<td>1.5</td>
<td>8.9</td>
</tr>
<tr>
<td>Purchased 50% of improved area</td>
<td>3.0</td>
<td>9.7</td>
</tr>
<tr>
<td>Own retained - Maize @10kg/ha</td>
<td>1.5</td>
<td>9.7</td>
</tr>
<tr>
<td>Purchased 50% of improved area</td>
<td>3.0</td>
<td>2.4</td>
</tr>
<tr>
<td>OXEN HIRE FOR PLOUGHING</td>
<td></td>
<td>0.0</td>
</tr>
<tr>
<td>N$/ha</td>
<td>415.0</td>
<td>416.0</td>
</tr>
<tr>
<td>VALUE OF PRODUCTION NET OF CASH/KIND COSTS</td>
<td>1617.6</td>
<td>1126.7</td>
</tr>
<tr>
<td>HOUSEHOLD LABOUR INPUTS (days)</td>
<td>55.9</td>
<td>55.9</td>
</tr>
<tr>
<td>Hand hoeing</td>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Oxploughing</td>
<td>8.1</td>
<td>8.1</td>
</tr>
<tr>
<td>Planting</td>
<td>6.7</td>
<td>6.7</td>
</tr>
<tr>
<td>Weeding</td>
<td>24.7</td>
<td>24.7</td>
</tr>
<tr>
<td>Harvesting</td>
<td>11.5</td>
<td>11.5</td>
</tr>
<tr>
<td>VALUE OF PRODUCTION NET OF CASH/KIND COSTS PER HOUSEHOLD LABOUR DAY (N$/day)</td>
<td>29.0</td>
<td>20.2</td>
</tr>
</tbody>
</table>
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**

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

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**

<table>
<thead>
<tr>
<th></th>
<th>No new land cleared</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UNITS</td>
</tr>
<tr>
<td>CROP AREA</td>
<td></td>
</tr>
<tr>
<td>Maize - traditional</td>
<td>2.3</td>
</tr>
<tr>
<td>Maize - improved</td>
<td>0.6</td>
</tr>
<tr>
<td>Sorghum - traditional</td>
<td>1.6</td>
</tr>
<tr>
<td>Sorghum - improved</td>
<td>0.0</td>
</tr>
<tr>
<td>Millet - traditional</td>
<td>0.4</td>
</tr>
<tr>
<td>Millet - Improved</td>
<td>0.2</td>
</tr>
<tr>
<td><strong>GROSS VALUE OF PRODUCTION</strong></td>
<td><strong>3,592.5</strong></td>
</tr>
<tr>
<td>Yield Millet/Sorghum kg/ha</td>
<td>450.0</td>
</tr>
<tr>
<td>Yield Maize kg/ha</td>
<td>500.0</td>
</tr>
<tr>
<td>Price Millet/Sorghum NS/kg</td>
<td>1.5</td>
</tr>
<tr>
<td>Price Maize NS/kg</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>NON HOUSEHOLD LABOUR</strong></td>
<td></td>
</tr>
<tr>
<td>@ NS1 per day (NS)</td>
<td>1.0</td>
</tr>
<tr>
<td>Hand hoeing (18.65%) (days)</td>
<td>2.2</td>
</tr>
<tr>
<td>Oxploughing (34.78%) (days)</td>
<td>10.0</td>
</tr>
<tr>
<td>Planting (18.96%) (days)</td>
<td>2.1</td>
</tr>
<tr>
<td>Weeding (15.53%) (days)</td>
<td>6.6</td>
</tr>
<tr>
<td>Harvesting (13.52%) (days)</td>
<td>4.2</td>
</tr>
<tr>
<td><strong>OXEN HIRE FOR PLOUGHING</strong></td>
<td></td>
</tr>
<tr>
<td>NS/ha</td>
<td>416.0</td>
</tr>
<tr>
<td><strong>SEED COSTS</strong></td>
<td></td>
</tr>
<tr>
<td>- Own retained - Millet/Sorghum @ 4kg/ha</td>
<td>1.5</td>
</tr>
<tr>
<td>- Purchased 50% of improved area</td>
<td>3.0</td>
</tr>
<tr>
<td>- Own retained - Maize @10kg/ha</td>
<td>1.5</td>
</tr>
<tr>
<td>- Purchased 50% of improved area</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>VALUE OF PRODUCTION NET OF CASH/KIND COSTS</strong></td>
<td><strong>3,514.5</strong></td>
</tr>
<tr>
<td><strong>HOUSEHOLD LABOUR INPUTS (days)</strong></td>
<td><strong>96.7</strong></td>
</tr>
<tr>
<td>Hand hoeing (81.35)</td>
<td>9.0</td>
</tr>
<tr>
<td>Oxploughing (65.22%)</td>
<td>18.5</td>
</tr>
<tr>
<td>Planting (81.04%)</td>
<td>8.9</td>
</tr>
<tr>
<td>Weeding (84.47%)</td>
<td>34.4</td>
</tr>
<tr>
<td>Harvesting (86.48%)</td>
<td>25.8</td>
</tr>
<tr>
<td><strong>VALUE OF PRODUCTION NET OF CASH/KIND COSTS PER HOUSEHOLD LABOUR DAY (NS/day)</strong></td>
<td><strong>36.3</strong></td>
</tr>
</tbody>
</table>
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. Returns 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**

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

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**

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

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.
<table>
<thead>
<tr>
<th>Worker No</th>
<th>NAME</th>
<th>Date First Recorded</th>
<th>HH Memb</th>
<th>Sex</th>
<th>Age (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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## FMS 2 ALL DRAFT POWER USED FOR ON AND OFF FARM ACTIVITIES

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# HOUSEHOLD LIVESTOCK INVENTORY CHANGES

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<th>(C) Age Category</th>
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<th>(E) Where Event Occurred</th>
<th>(F) If Died Why</th>
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Household Number: 
Visit Number: 

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**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
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<th>Main Place of Residence</th>
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</table>
Count stock/items with the assistance of the farmer and put the number in the appropriate box.

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<th>Poultry:</th>
<th>Donkeys:</th>
<th>Sheep:</th>
<th>Mules:</th>
<th>Horses:</th>
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<td>Others</td>
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<td>Heifer</td>
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FMS10: AREA MEASUREMENT

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

A: Crop description

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<th>Main crop</th>
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<th>3rd crop</th>
<th>4th crop</th>
<th>5th crop</th>
<th>6th crop</th>
<th>7th crop</th>
<th>8th crop</th>
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B: Field Information

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<th>Bearing</th>
<th>Antilin</th>
<th>Main crop planted last year</th>
<th>Manure(M) or Fertiliser(F) application:</th>
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Field sketch map

Areas to be deducted

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

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2: Main crops grown over the last five years

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</table>

3: Distance from the household to the field.

1. First option:

Km    Meters

OR

2. Second option:

Hours    Minutes

Date checked by supervisor: ..................................
Supervisor: ..............................
### Rainfall and Temperature

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FMS 12 QUARTERLY RECORD OF REGULAR ACTIVITIES and HOURS PER SESSION

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<td>Visit Number:</td>
<td>Date Checked:</td>
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<td>Date Entered:</td>
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Regular activities:

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<tr>
<th>Line</th>
<th>(A) Type of Activity</th>
<th>(B) Who has been doing it</th>
<th>(C) Session Worked M/A</th>
<th>(D) Hours per Session</th>
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</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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)
### QUARTERLY RECORD OF LOCAL PRIZES

<table>
<thead>
<tr>
<th>Village:</th>
<th>Supervisor:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Number:</td>
<td></td>
</tr>
<tr>
<td>Visit Number:</td>
<td></td>
</tr>
</tbody>
</table>

**Date of Enumeration:**

**Date Checked by Supervisor:**

**Date Entered into Computer:**

---

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Cash price(N$)</th>
<th>In kind(N$)</th>
<th>Mixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahangu grains (price per 1kg)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mahango flour (price per 1 kg)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maize meal (price per 1kg)?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Cash price(N$)</th>
<th>In kind(N$)</th>
<th>Mixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahangu grains (price per 1kg)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mahango flour (price per 1 kg)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maize meal (price per 1kg)?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Cash price(N$)</th>
<th>In kind(N$)</th>
<th>Mixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahango improved seeds (price per kg)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sorgum improved seeds (price per kg)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maize improved seeds (price per kg)?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Cash price(N$)</th>
<th>In kind(N$)</th>
<th>Mixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 oxen for 1 full day?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 oxen and a plough for 1 full day?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 oxen, a plough and labour for 1 full day?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 plough?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Item</th>
<th>Cash price(N$)</th>
<th>In kind(N$)</th>
<th>Mixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing: 1 field worker per plot?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weeding: 1 field worker per plot?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threshing: 1 field worker per plot?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harvesting: 1 field worker per plot?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herding: 1 person for 1 week?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A cart and animal draft?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Page 1
### Breeding stock

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

### Cull animals

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

### Goats

Did you *sell* any goats during the last 3 months?  
If yes, how many?  
How much did you get per goat?  
Did you *buy* any goats during the last 3 months?  
If yes, how many?  
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):  

<table>
<thead>
<tr>
<th></th>
<th>Crop1</th>
<th>Crop2</th>
<th>Crop3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of crop(s) growing on plot:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of ears:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wet weight (g):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry weight (g):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grain weight (g):</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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):  

<table>
<thead>
<tr>
<th></th>
<th>Crop1</th>
<th>Crop2</th>
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