MARKETING OF MAHANGU
BY
THE NORTHERN NAMIBIA FARMERS' CO-OPERATIVE LTD
(NNFC)

Feasibility Study

CONSULTANCY REPORT

For

NNFC
&
MAWRD, Division of Co-operative Development

By

Michel Mallet & Selma EL OBEID
Criaa SA - DC

November 1997
1. INTRODUCTION

The Northern Namibia Farmers' Co-operative Ltd (NNFC) is a recently created farmers' service co-operative of a multi-purpose type: agricultural marketing and supply - consumers' savings & credit, (the latter is not developed at all and the agricultural marketing service is so far limited to a facilitating agency function for the Meatco cattle marketing scheme).

The NNFC by-laws were adopted at a Congress on 18/05/96. It became provisionally registered early 1997 (Reg. No 01/97) as one of the first Northern Regions' co-operatives under the new Co-operative Act (No 23/1996). The registered office is in Ongwediva at the Chairman's residence.

NNFC is a primary co-operative structured in Branches where the membership is affiliated. The paid-up membership is around 300\(^2\). There are at present 5 constituted Branches: Okahao, Onesi, Tsandi, Ogongo (in the Omusati Region) and Ompundja (in the Oshana Region); 2 other Branches are considered to be emerging in Ombambi and Elim (Omusati) but do not yet formally have membership. Each established Branch elects a Management Committee of 7 members (Chair, Secretary, Treasurer, ...) at its Branch annual general meeting, which also elects an additional 7 representatives to the NNFC Annual General Meeting of Delegates. The NNFC Board of Directors consists of 15 members (3 per Branch, including at least 1 woman from each Branch).

The NNFC does not have (yet) a Head Office, a Chief Executive Officer (Manager), or other employees at central co-operative level. Although the provision of a CEO is included in the by-laws, the presently available financial resources of the co-operative prevents this from materialising.

Apart from the assistance of the Division of Co-operative Development of MAWRD, NNFC has also been supported, since 1995, by the Northern Namibia Rural Development Project (NNRDP) based in Ongwediva. NNRDP has been providing part time technical assistance, training and advice, as well as material and managerial support to 3 Branch co-operative shops, established fairly recently at the end of 1996 (October).

The present consultancy arises from a resolution endorsed at the 2nd NNFC Congress on 24 May 1997 that requested NNFC to explore the possibilities of getting engaged in the marketing of Mahangu on behalf of its members.

The need to look into the feasibility of Mahangu marketing was also prompted by the 'bumper' harvest this year in most part of the North Central Regions and the logical anticipation that somehow large quantities of Mahangu surplus would be offered for sale on the market by farmers, and NNFC members (and potential members) in particular. However, the terms of reference rightly stated that the study should be conducted on the condition, as outlined by the Honourable Minister of Agriculture, Water and Rural Development, that the price of Mahangu be based on what the consumer is prepared to pay and therefore be roughly on parity with the price of maize.

---

1 Break away of some Branches from OMAFA at the end of 1995.
2 According to Branch records of August 1997 (see Annex IV); some 'members' appear to have not yet paid their full co-operative share capital and annual fees as stipulated in the new NNFC by-laws of May 1996.
2. **METHOD**

As prescribed in the terms of reference (see ANNEX I) the study method was conducted in a participatory manner involving the NNFC leadership as much as possible. Furthermore, the consultant was requested to carry out the assignment in two stages:

a) A feasibility study concerning NNFC's activities in Mahangu marketing;

b) Based on the acceptability of the plan by the NNFC leadership to then produce a business plan (acceptable to a lending institution such as the Agribank).

The present report deals with the first stage.

The method and programme of work was discussed and agreed upon between the consulting team and the Board of NNFC:

- Briefing, discussion and decision making meetings with the Board of Directors (BoD) or Executive Committee (Exco) of NNFC held at regular intervals (see below);

- Allowing in between these meetings, the Board members on the one hand to consult the membership in their branches, and the consultants on the other hand to conduct field and market investigation and interviews (due to time availability of the Exco members, their direct participation into these investigations was fairly limited).

The following meetings attended by the consultants were arranged with NNFC:

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 July 97</td>
<td>Board meeting at Okahao</td>
<td>20 BoD &amp; branch MC</td>
</tr>
<tr>
<td>28 July</td>
<td>Branch meeting at Ompundja</td>
<td>21 MC &amp; members + 1 AET</td>
</tr>
<tr>
<td>29 July</td>
<td>Branch meeting at Okahao</td>
<td>28 MC &amp; members</td>
</tr>
<tr>
<td>31 July</td>
<td>Branch meeting at Tsandi</td>
<td>21 MC &amp; members</td>
</tr>
<tr>
<td>1 August</td>
<td>Branch meeting at Onesi</td>
<td>26 MC &amp; members + 1 AET</td>
</tr>
<tr>
<td>2 August</td>
<td>Exco meeting at Oshakati</td>
<td>3 BoD/Exco</td>
</tr>
<tr>
<td>17 August</td>
<td>Board meeting at Okahao</td>
<td>5 BoD &amp; 2 Agrifutura (Mahangu / Tractor) trainees</td>
</tr>
<tr>
<td>20 August</td>
<td>Exco meeting in Oshakati</td>
<td>4 Exco members</td>
</tr>
<tr>
<td>28 August</td>
<td>Meeting in Windhoek</td>
<td>The Chairman</td>
</tr>
<tr>
<td><strong>September</strong>: Communication by tel. and fax, some work assignment given to NNFC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 October</td>
<td>Exco meeting in Oshakati</td>
<td>2 Exco members at NNRDP</td>
</tr>
</tbody>
</table>
Field investigations in the North Central Regions were mainly conducted from end of July to end of August 1997. During this period the Mahangu market was at a near standstill as the supply from farmers was not matched by any significant demand from buyers. This had serious negative implications for NNFC in its effort to easily market Mahangu surplus from its members and brought delays in completing the feasibility study.

A follow-up market investigation was carried out at the end of October when the market situation started showing signs of recovery.

This report has been written for both the NNFC and MAWRD, who jointly commissioned this study. Some parts may be considered a bit long and some comments may be slightly out of the strict frame of the terms of reference, but it is because they are intended for the attention of the Co-operative leadership.

The report is in three parts:

- Findings on the Mahangu market environment with focus on grain and flour market demand and supply for both maize and millet. Some general recommendations on marketing are thereby formulated to NNFC.
- Evaluation of the capacity of the Co-operative in marketing Mahangu is thereafter presented with the results of the discussions with NNFC Branches and leadership.
- Conclusions on the feasibility of co-operative involvement in Mahangu marketing for the short and longer term.

The valuable assistance provided by Mr Ipinge and Mr Shatona of the MMIU, and the relevant information and advise from Mr Hoffmann of NAB must be acknowledged by the authors.
3. FINDINGS: MARKET ENVIRONMENT, GRAIN and FLOUR DEMAND and MARKET SUPPLY

This chapter briefly outlines the cereal grain market in the North Central Regions as observed and analysed by the consultants. It is essential to examine the present market and its trends for any Mahangu marketing study and for NNFC Mahangu marketing feasibility in particular.

Various studies on Mahangu marketing have been conducted in the past years (mainly from 1991) by different researchers and consultants (see bibliographic list in ANNEX XI). Stephan Keyler’s research based on field work during the 1992/93 season in former Ovambo and Kavango regions is one of the most detailed studies of the Mahangu sector.

We quote the following extract from his report as an introduction:

Research findings demonstrate that few farmers are millet self-sufficient and only 10% of millet production is commercially traded. Most people in the study zone prefer millet over maize. But millet’s scarcity and high price leaves imported maize to dominate the commercial food market and attracts millet imports from Angola.

Our analysis draws from these research reports and our own observations are in line with these studies. However, some important developments have taken place this year which introduce new elements to be taken into account.

These elements have influenced the grain market environment and may further affect the Mahangu market:
- A good Mahangu production season this year following successive poor years;
- A government subsidised drought relief Mahangu purchase scheme ended in July 1997, which disrupted the supply - demand mechanism by setting buying prices and price expectations at a high level in a year of significant surplus production;
- The introduction of gradual trade liberalisation and deregulation measures in the maize market in Namibia, which combined with a good regional maize harvest are pushing down prices on the local market;
- Private businesses investing in the Northern Regions in small scale processing technologies, for Mahangu service milling and commercial processing in particular.

An overall study of the Mahangu market and its competitiveness is being finalised by a NRC consultant as part of a consultancy on the Future Activities of the MMU. Another consultancy on Grain Storage in Northern Communal Areas of Namibia was also commissioned by the Namibian Agronomic Board.

It is recommended that the NNFC leadership be provided with a copy of these reports to study them.

---

3 “Economics of the Namibian Millet Subsector”, Michigan State University, 1996
The present chapter intends to highlight to the Co-operative some important aspects of the Mahangu market environment to take into consideration for deciding on the feasibility of the possible options available to NNFC.

3.1 Mahangu Grain Trading:

Our brief research was done by direct observations and informal interviews conducted with producers, buyers, processors and some consumers, mainly during the August month. However, we would like to stress that at that time this year, the Mahangu grain market (rural or urban) was almost at a stand still.

Grain traders indicated the period between October and May (the following year) as the best time for Mahangu transactions. This was confirmed later on during our field work of October, when Mahangu grain trading started reappearing at the rural ‘Pension Day Markets’.

3.1.1 Farmers’ Production, Storage, Surplus of Mahangu:

In the North Central Regions, Mahangu (pearl millet) is the main cereal crop and is grown by almost every household.

The Mahangu crop production is rainfed and labour intensive, usually referred as ‘subsistence agriculture’, it is characterised by:

- High variability of production from year to year depending on rainfall;
- High risk of production failure;
- Low yield per cultivated hectare;
- Low productivity of work and consequently low return to labour.

---

6 The Mahangu demand depends on the harvest conditions. Last year (1996) when production was below average, Mahangu selling started earlier in August.

7 The chart below illustrates the high variation of rainfall from year to year and between regions. It also shows that the average annual rainfall has significantly dropped during the last 15 years.

---

8 The analysis of seasonal rainfall data indicates that about 5 years out of 10 production seasons in the 4 O’s have to be classified as poor harvest years due to low rainfall and/or bad rainfall distribution (Keyler, 1996).
The majority of producers are classified as smallholders with less than 5 cultivated hectares (65%). All these factors combined make the quantities of marketable millet very limited even in years of good rains as farmers tend to store their surpluses for bad production years.

<table>
<thead>
<tr>
<th>Region</th>
<th>Production Year (millet/sorghum* production in tonnes)</th>
<th>1994/95</th>
<th>1995/96</th>
<th>1996/97 (provisional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omusati</td>
<td>(average yield)</td>
<td>8 100 T</td>
<td>18 000 T</td>
<td>32 100 T</td>
</tr>
<tr>
<td></td>
<td>(90 kg/ha)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oshana</td>
<td>(average yield)</td>
<td>4 200 T</td>
<td>6 500 T</td>
<td>12 900 T</td>
</tr>
<tr>
<td></td>
<td>(120 kg/ha)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total of the 2 regions</td>
<td></td>
<td>12 300 T</td>
<td>24 500 T</td>
<td>45 000 T</td>
</tr>
</tbody>
</table>

* Sorghum production is estimated at 5% of the total.

Source: Namibian Early Warning and Food Information Unit

The 1997 production forecast for these two regions and the very rough estimate of 10% marketable surplus based on Keyler’s report figures (Keyler, 1996), would suggest that some 4500 tonnes of Mahangu surplus could be offered on the market this season in the Omusati and Oshana regions where NNFC has its membership base.

Producers’ willingness to market surplus Mahangu is not confined to the Omusati and Oshana regions. By August the MMIU recorded selling inquiries of some 350 tonnes from producers farming mainly in Oshikoto and Ohangwena regions. These inquiries came essentially from large and medium farmers as the minimum quantity proposed by a seller was around 5 tonnes. NDC has likewise recently received several inquiries about selling large quantities of Mahangu.

During the period November 1996 to July 1997, the last government drought millet purchase scheme implemented by NDC bought a total of only 483 T of Mahangu (details in ANNEX V). Omusati region was the largest provider with 385 T (79%) and Oshana the second largest with nearly 70 T (15%). The constituencies providing the largest share of the total were as follows: Onesi (217 T), Uutapi (123 T), Ompundja (61 T) and Tsandi (44 T)10.

When asked about the quality of last year’s Mahangu bought, the NDC Regional Representative said that it was good with no apparent insect infestation and generally clean of foreign matter.

Threshed Mahangu grain is most often stored in traditional granaries (*Eshisha*, *pl. Omashisha* - *Okaanda*, *pl. Omaanda* in *Oshikwanyama*) of various sizes. Commonly a granary is said to contain between 45 latas (± 700 kg) and 130 latas (± 2 000 kg)11.

---

9 S. Keyler (1996) has estimated the average household production time as 73 work-days per ha (from field preparation to threshing); for yields ranging from 125 kg/ha (poor) to 250 kg/ha (middle) and 600 kg/ha (good) the calculated productivity of work is respectively 1.7, 3.4 and 8.2 kg of Mahangu per work-day.

10 Despite the high price offered by the government scheme and the decentralised intake, the quantity purchased may look disappointing. Two main reasons could explain this; firstly the intake was dependent on registration and organisation conducted by local Councillors, with different levels of involvement; secondly the grain to be sold was last year’s harvest which was generally low and it was moreover too early for farmers to decide what to sell when the new crop was not harvested and threshed.
Apparently not every household makes its own granary/ies and Omashisha are sold both in rural areas and towns. Their prices are fairly high with sellers asking between N$ 500 and N$ 1 000 (and sometimes more) depending on the size. Storing large quantities of Mahangu may be an expensive investment if the household needs to buy additional granaries.

Farmers’ decisions to sell surplus Mahangu are not only based on assessment of the level of reserves wanted to cover inevitable deficit years to come, but also on the cost of buying additional storage granaries and the risk of losing part of the stock (damages to the grain in granaries by pests and heavy rains are often mentioned by farmers as a serious risk).

It is also clear that farmers tend first to sell any old grain surplus when new harvest grain arrives.

Our first set of conclusions for a NNFC Mahangu marketing activity are as follows:

**Conclusions No 1 for NNFC Mahangu marketing**

| a) | Despite the tendency to store surplus Mahangu, there should be this year an exceptionally high quantity of surplus available from farmers on the market, especially in the areas of NNFC Branches in Omusati and Oshana regions. |
| b) | The government drought Mahangu purchase did not mobilise huge quantities of grain and had limited impact (except on price expectations, see below). |
| c) | It is not clear what quantity and quality of old grain surplus (if any) would be offered as compared with surplus grain from the new harvest. |
| d) | Farmers seem to start deciding about selling new Mahangu harvest surplus as from August, September or October depending on the year’s harvest. |
| e) | Surplus Mahangu form local farmers will not be available every year in quantity as for this present season, co-operative Mahangu marketing activity might have to be discontinued every other year depending on the harvest (which is obviously not easy to predict ...). |
| f) | As the available grain surplus is dispersed in the rural homesteads, one of the advantages of a farmers’ co-operative providing a Mahangu marketing service is the ability to dispatch information on available surplus to potential buyers and possibly gather the bagged grain in specific locations for easy loading to buyers. If this service is done efficiently, it can represent a comparative advantage over private traders. |

### 3.1.2 Mahangu Selling - Buying Prices :

Price data gathering was somehow limited (see ANNEX VII) as very few transactions were taking place at the time of our field work. Still the table below is an attempt to summarise the data collected which illustrate clearly the wide range of price levels in the Mahangu sector. The Likwama price structure is added to broaden the reference base.

Producers’ price expectations are high at between N$ 1.2 and 1.6 /kg (farmers inquiries at MMIU, confirmed by our field investigation). Farmers were often referring to the Government Drought

---

11 Lata: traditional measurement in volume (usually a 20 L bucket), weighing approximately between 15 and 16.5 kg depending on the bulk density of the Mahangu grain (see ANNEX VI).
Relief Scheme buying prices (N$ 1 450 /T). The high price expectation of farmers can also be explained by the low work productivity of the Mahangu crop production (see note 9 above).

Interestingly, the traders with Mahangu grain stocks were also having high price expectations but were selling very little or nothing at the time of the investigation. Selling prices ranged from N$ 70 per 50 kg bag (N$ 1 400 /T) at a well known wholesaler in Oshakati (grain said to be bought partly from Angola and partly locally) to N$ 100 per 50 kg bag (N$ 2 000 /T) in one shop in Ondangwa (Mahangu grain from own farm production). Business people bartering Mahangu grain with customers for groceries in their shops (Oshakati and Ondangwa) were buying at roughly N$ 15 per lata (N$ 1000 /T) and selling the same Mahangu grain at N$ 25 per lata (N$ 1700 /T).

No Mahangu grain was found on the Oshakati and Ondangwa open markets as well as on the rural ‘Pension Day’ markets visited in July/August.

Table 2. Comparison of different Mahangu prices according to origin

<table>
<thead>
<tr>
<th>Origin</th>
<th>NS/tonne</th>
<th>NS/lata</th>
<th>Source &amp; comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected Mahangu price at farm gate in 4 O’s:</td>
<td>1 200 - 1 600</td>
<td>18 - 24</td>
<td>inquiries to MMIU</td>
</tr>
<tr>
<td>Mahangu selling price in Oshakati and Ondangwa:</td>
<td>1 400 - 2 000</td>
<td>21 - 30</td>
<td>Consultants’ survey</td>
</tr>
<tr>
<td>Government drought scheme buying price:</td>
<td>1 450</td>
<td></td>
<td>Scheme discontinued</td>
</tr>
<tr>
<td>Okavango Mahangu price at farm gate:</td>
<td>750</td>
<td>11.25</td>
<td>Transaction facilitated by MMIU</td>
</tr>
<tr>
<td></td>
<td>900</td>
<td>13.5</td>
<td>Price proposed by FSP farmers</td>
</tr>
<tr>
<td>- LFCU Mahangu buying price in local associations:</td>
<td>700 - 800 *</td>
<td>10.5 - 12</td>
<td>Feed Master scheme and Likwama Mahangu flour small scale commercial production</td>
</tr>
<tr>
<td>- LFCU Mahangu buying price in Katima Mulilo:</td>
<td>800 - 900 *</td>
<td>12 - 13.5</td>
<td></td>
</tr>
<tr>
<td>- LFCU Mahangu grain selling price in Katima Mulilo:</td>
<td>1 000</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Mahangu average buying price in Angola:</td>
<td>466</td>
<td>7</td>
<td>MMIU</td>
</tr>
<tr>
<td>Indian Mahangu (estimated) delivered cost to Oshakati:</td>
<td>850</td>
<td>12.75</td>
<td>Mahangu imported in 1996 from India by an Oshakati trader. Delivered cost to Walvis Bay was around N$ 700 /T (MMIU)</td>
</tr>
</tbody>
</table>

* Buying price for Likwama co-operative members higher than for non-members.
** It might be interesting to know the price it was sold for.
Recently (October) the MMIU facilitated the procurement of 150 T of Mahangu grain from Southern Kavango by Eluwa wholesales, purchased at N$ 750 /T in bags and transported to Oshakati by the buyer’s own trucks (the delivered cost to Oshakati is at least N$ 900 /T)\footnote{12}. 

3.1.3 Local Buyers (Traders in Mahangu):

Potential buyers (as indicated by MMIU) were approached in August to confirm their interest in buying any NNFC Mahangu grain. We must report that at that time of our field work no one was actually interested, whatever the price or the delivery arrangements to their warehouses or shops. The fact was that at this time of the year the demand was very limited as most households had a good harvest and their own millet to consume. Those business people were sitting with very slow moving Mahangu stocks.

The situation had not much changed in October, but may turn in the coming weeks or months as the Mahangu demand from deficit households should raise again.

It must be noted that for these urban entrepreneurs, Mahangu trade only represents a small part of their business activity and is taken opportunistically on account of the relatively high profit margins expected. The speculative nature of the trade was also documented by Keyler\footnote{13}.

It is not clear at this stage what will be the demand (price and quantity) from the new Mahangu processors who have just recently acquired processing equipment to commercially produce decorticated millet flour in the North Central Regions. Further discussions (and negotiations) will certainly be necessary. Based on Eluwa procurement in Kavango, a price of N$ 900 /T could be acceptable.

3.1.4 Mahangu Buyers outside the 4 O’s Regions:

A rapid survey was conducted in Windhoek to test the response of business people having shown some interest in Mahangu grain trading. Not surprisingly, the interest was very limited. It is nevertheless worthwhile taking note of their reactions.

A Katutura based supermarket willing to make a market trial, ordered recently some millet grain bags from Caprivi through the regional Farmers’ Co-op. The grain was said to be infested with insects and the business owner apparently cancelled the deal.

Other business people expressed mixed feelings when the names ‘co-operative’ and ‘farmers from the North’ were mentioned. The expressed concerns (be they justified or not) referred to the regularity of supply\footnote{14}, the quality of the grain and packaging, the transport arrangements and the prices.

\footnotetext{12}{The distance to Oshakati is estimated at ± 400 km and the transport cost should be at least N$ 150 /T, without back load.}
\footnotetext{13}{In 1993, S. Keyler calculated the profit margin of urban traders at 37 %. This year, expected margins look even higher at 70 % for the urban traders surveyed.}
\footnotetext{14}{Some years ago, Nutrifood in Okahandja tried to use Mahangu in a soya based food, but gave up following problems of regular supply of Mahangu (Mr F. Wassermann, \textit{pers. comm.}).}
The Windhoek based animal feed company is to our knowledge the only one buying Mahangu grain in Windhoek. Its requirements are quite limited (36 tonnes every two months) and partly fulfilled by a supply arrangement with LFCU through Eagle Mill in Katima Mulilo (which checks the weight of bags and organises back load transport to Windhoek). The company prefers Mahangu in 50 kg bags which have a uniform weight.

**Conclusions No 2 for NNFC Mahangu marketing**

- a) The demand for Mahangu grain in the 4 O’s regions needs to be closely followed up; the market that is standing still may rise soon.
- b) Outside the Northern Regions notably in Windhoek, there seems to only be a limited demand for Mahangu grain.
- c) Mahangu grain can be imported from outside the country in the 4 O’s at a very competitive price.
- d) The government subsidised Mahangu buying scheme has raised price expectations not only with producers but also with traders in a year of exceptionally good supply.
- e) Willing Mahangu buyers are concerned about the quality of grain (reference to insect infestation), the regularity of supply, the bagging (sound bags of uniform weight) and competitiveness of the price.
- f) NNFC should avoid taking last year grain harvest unless strict insect infestation spot checks can be organised before Mahangu grain is procured from farmers-members.

### 3.2 Mahangu Grain Processing:

In the 4 O’s as in all the northern crop growing communal areas where Mahangu is the staple food, the operations of processing Mahangu grain into flour are predominantly carried out manually (with mortar and pestle) at the homesteads by women. But the mechanised processing of Mahangu has been recently expanding mainly through private service milling units installed both in urban and electrified rural areas. Commercial mills producing a decorticated flour are making their début.

#### 3.2.1 Service Milling:

Private service mills are mushrooming in both municipal areas (Oshakati, Ongwediva, Ondangwa) and even more in rural areas, especially in the centres connected to the electricity grid. Our rapid (and non exhaustive) survey identified some 26 privately run\(^{15}\) service mills (Oshikoto and Ongwena Regions were not much visited in our field work); of which 2 or 3 were installed in 1994 or before, 9 in 1995 - 96, and 12 only up to July 1997 (see details in ANNEX VIII).

The total number of service mills installed in the 4 O’s could well reach as much as 50. In the only month of October, the local agent had installed 6 new mills and had 3 paid orders.

\(^{15}\) Uukwaludhi Integrated Area Based project sponsored petrol engine driven hammer mills excluded (no more operating anyway).
Nearly all these mills have been acquired by business persons on a cash basis. The most frequent model installed is the Drotsky M16A (powered by a 15 kW electric motor). Otjiwarongo Motors & Tractors is the main supplier of these machines, for the simple reason that the company established a field and repair service in Oshakati providing installation and maintenance work as well as information, advice and quotations.

Few mills are running at capacity and the more recent the installation the less busy the mill is. These observations tend to suggest that it takes some months (up to may be a year) for a service mill to establish a regular clientele. The most busy service mills that the consultants came across were installed more than one year ago and were running at 30 to 40 latas per day (450 to 600 kg). The new ones were running between 5 to 10 latas per day (75 to 150 kg).

These service mills only provide the milling operation and customers most often bring decorticated grain prepared at home. The household Mahangu decorticating is conducted as a wet process by which the grain is soaked in water to ease the mortar and pestle dehulling. As a consequence the dehulled grains brought to the mills are most often very wet (the fermentation of the wet grain and flour adds a special taste to the Mahangu flour and to the cooked Oshifima, which is particularly appreciated). But, the machine milling of wet grain through 0.8 mm sieves is quite a hard and time consuming process.

It must be noted that under these conditions the capacity specifications of the milling machine manufacturers may be quite overestimated. The consultants observed that it takes between 5 to 10 minutes to mill one wet lata through a 0.8 mm sieve with a 15 kW Drotsky M16 hammer mill. That gives a throughput between 90 and 180 kg per hour! And that may partly explain why the milling charge are so high and why such big machines with electric engines of 15 and 22 kW are systematically installed in the 4 O’s.

Payment in kind for service milling was not observed. All payments are in cash except may be at the oldest urban based service mill of Ondangwa where some flour (and bran) is also sold, although in small quantity.

The service milling tariff varies between N$ 6.50 and 12.00 per lata, N$ 8.00 and 12.00 per lata (N$ 0.53 - 0.80 /kg) in urban areas, and N$ 6.50 to 9.00 (0.43 - 0.60 /kg) in rural areas (see details in ANNEX VIII). The milling quality is very fine, and a second milling to further refine the flour is very frequent without extra charge.

Two service milling units require special mention:

- The WAD unit at Mahanene is the only one offering a combined dehulling and milling service and has the cheapest charge (N$ 0.25 per kg for each operation, N$ 0.50 per kg for both). The MAWRD Japanese Kokuyo dehuller and the RIIC (Botswana) hammer mill are used, powered by two 5.5 kW motors. The equipment allows a dry processing of the whole grain brought by the customers and there do not seem to be any complaints about the quality of the flour obtained.

---

16 Agribank had approved 3 loans for buying hammer mills this year (applications submitted last year); 3 other applications were being considered. A business women in Onanya was granted a loan by the NNRCCI for a service mill. Amongst the 570 members of NNRCCI, 25 are hammermills owners (Mr D. Angula, pers. comm.).
The Oniipa Parish service mill at Onandjokwe (which used to operate a roller mill for Mahangu and now has a Drotsky M16A) utilises a self-made grain cleaner made of 2 vibrating sieves and a fan, powered by an electric motor. The grain cleaning system is used by the millers when the grain brought for milling contains sand and other foreign matter. The milling charge is then increased by N$ 1.00 per lata.

Lastly, it is worth pointing out two other service mills located in other NCAs. The Katemo Co-operative (unregistered co-op.) service mill in Rundu operates 2 hammer mills and 1 dehuller supplied from Harare by Enda - Zimbabwe, but the machines are now having serious technical problems and one hammer mill is broken down and not repaired.

The Likwama service unit in Katima Mulilo operates one hammer mill and one dehuller also from Zimbabwe, but the inevitable technical problems are being addressed more promptly and the unit is working at full capacity.

<table>
<thead>
<tr>
<th>Table 3.</th>
<th>Some data about the Likwama service mill in Katima Mulilo</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Service charge:</td>
<td>. Milling: Members: N$ 0,25 /kg Non-members: N$ 0,30 /kg&lt;br&gt;. Dehulling: Members: N$ 0,25 /kg Non-members: N$ 0,30 /kg</td>
</tr>
<tr>
<td>- Grain processed:</td>
<td>. Milling: Maize 92 % Sorghum &amp; Millet: 8 %&lt;br&gt;. Dehulling: Maize 85 % Sorghum &amp; Millet: 15 %</td>
</tr>
<tr>
<td>- Staff:</td>
<td>3 Millers and 1 Clerk.</td>
</tr>
<tr>
<td>- Effective capacity (over 8 months, period Jan. - Aug. 1997):</td>
<td>Qty processed</td>
</tr>
<tr>
<td>Milling:</td>
<td></td>
</tr>
<tr>
<td>. Monthly average</td>
<td>36 T</td>
</tr>
<tr>
<td>. Pick month (Aug.)</td>
<td>54,35 T</td>
</tr>
<tr>
<td>Dehulling:</td>
<td></td>
</tr>
<tr>
<td>. Monthly average</td>
<td>20 T</td>
</tr>
<tr>
<td>. Pick month (Aug.)</td>
<td>26,20 T</td>
</tr>
<tr>
<td>- Turn-over:</td>
<td>Average per month N$ 15 420 (Jan. - Aug. 1997)</td>
</tr>
</tbody>
</table>

Interestingly, the Likwama Mill also does some commercial processing of millet after hours or on Sundays, but on a very small scale. The extraction rate of the dehulling is approximately 80 % and the milling is carried out through a 1 mm sieve. The millet grain is procured at a cost of around N$ 900 to 1 000 per tonne delivered at the Mill. The flour is costed at N$ 1 500 per tonne ex-Likwama Mill. It has been marketed on a very small scale in Windhoek (and Katutura) to a clientele mainly made of civil servants originally from the 4 O's. The quality of the flour (dry processing, flour milled through 1 mm sieve) has no problem of acceptance.
Conclusions No 3 for NNFC Mahangu Marketing

a) In view of the rapid development of private service mills in many rural areas of the 4 O’s (most often not working at full capacity), NNFC Branches should look carefully into the demand and the competition from these existing service mills before envisaging setting up co-operative service units.

b) In towns, Oshakati seems quite saturated with service mills not all working at capacity, but there seem to be some room left in Ongwediva.

c) Service processing unit equipped with a dehuller and hammer mill seems to be acceptable to local customers; in addition it requires less powerful motors or engines and is therefore cheaper to install and run. The spare capacity of such unit could be used for some commercial milling.

d) If well located, well customised and well managed, co-operative service mills could offer a cheaper service than private profit making ones.

e) A co-operative Branch could accept service milling payment in kind (with part of the grain or flour) and initiate this way a small scale grain trading or flour retailing activity for the local market.

3.2.2 Commercial Milling:

Commercial milling refers to the production of flour for selling, obtained from grain procured on the market (or self-produced). Commercial milling is different from service milling in the sense that in the latter, the customers remain the owner of the grain being processed.

The supply of Mahangu flour on the market in the 4 O’s has been so far very limited.

At the Omatala open market in Oshakati, some informal women traders were selling decorticated Mahangu flour at around N$ 4,00 per kg. They usually buy grain coming from Angola at N$ 18,00 per lata (equivalent to N$ 1,20/kg), dehull it manually before bringing it to a service mill. The volume of flour traded in a day seems very small. The Ondangwa businessman mentioned above sells his flour at around N$ 3,50 per kg.

This expensive Mahangu flour (and bran) seems to be bought by customers for preparing the traditional Mahangu drinks: Oshikundu / Ontaku, Omalovu, ...

We did not find any Mahangu flour available on the market in rural areas. In our Tsandi visit farmers remembered from some years ago that Mahangu flour was once produced (probably with the local project sponsored hammer mills) which had got rotten in shops because it was too expensive (as compared with maize meal).

Larger scale commercial Mahangu milling operations are just beginning in the 4 O’s with the importation of small scale dehulling and milling equipment from Zimbabwe (private initiatives facilitated by the MMIU).

Two processing units each consisting of two dehullers and one hammer mill have been installed at the businessman’s wholesale premises, one at Oshakati in August (Eluwa) and the other one at Ongha (Ohangwena) in October (Oshinanenena). The equipment for a third unit (1 dehuller, 1 hammer mill) has been ordered also in Harare by another businessman and is to be installed at Omuthiya in the Oshikoto region. According to the MMIU, a fourth business man has ordered
processing equipment in India to be installed at Uutapi. Unfortunately, no details on the machinery, its capacity and its costs could be obtained.

The Harare manufacturer specifications indicate capacities of 270 kg/h for the dehuller and between 270 and 550 kg/h for the hammermill. Conservatively we would retain a throughput of 200 kg/h for one dehuller, this gives 400 kg/h for two, which quantity should be milled easily with the one hammermill. In 7 effective daily working hours (single shift), this processing unit could produce some 2.8 tonnes per day and 560 tonnes per year (assuming 200 effective processing days per year).\(^{17}\)

At the time of our first visit at Eluwa when the machine was first tried, the dehulling was experiencing some difficulties: a lot of grain was blown with the bran through the cyclone. This was due to a high proportion of very small and light grains in the raw material and probably also to an inappropriate setting of the cyclone fan (speed and/or air inlet?). The owner was advised to check the operations by weighing few batches of grain before dehulling, then after dehulling and thereafter milling to estimate the extraction rate and the level of losses.

Thereafter, Mahangu grain (of a much larger size) was procured in Kavango for the processing operations. The visual observation of the flour shows a fairly dark colour probably due to the Okashana variety grain and to an incomplete dehulling (we would guess an extraction rate of 85-90 %). A 1 mm sieve is probably installed in the hammer mill. According to Mahangu meal consumers the quality of the flour is very acceptable\(^{18}\) (a few small samples for testing were also given out in Windhoek by ourselves).

The Oshinanena unit at Ongha was also visited, but was at its inception with minor technical problems of alignment of the 3 dehuller pulleys\(^{19}\). Apparently the owner intends to process more maize than Mahangu and has tried producing a mix of maize and Mahangu flour.

In addition to the above mentioned businesses, it must be noted that there is a small number of medium scale commercial maize milling operations in the 4 O's, especially in Oshakati and Ondangwa towns.

3.2.3 Processing Technologies Available and Equipment in Use in Northern Namibia:

A wide range of equipment has been installed and used for processing Mahangu in Northern Namibia. ANNEX VIII is an attempt to list comprehensively these machines, their origin, capacities and specifications. The purpose of this section is not to review and evaluate this equipment but to highlight some critical elements of comparison. (The addresses of relevant manufacturers and suppliers of processing equipment and materials is provided in ANNEX X).

\(^{17}\) Three other dehullers imported from Zimbabwe could be operational soon. Assuming that they all operate in Mahangu commercial milling, the installed capacity in the 4 O’s would reach approximately (280 T/year x 5 units) 1 400 tonnes per year (in single shifts).

\(^{18}\) The product was launched at the Northern Namibia Trade Fair in Ongwediva in September.

\(^{19}\) At this stage there is an obvious lack of experience and technical skills for these new pieces of equipment brought into the Northern Regions. At the end of October, the Eluwa hammer mill had broken down and was awaiting spares from Zimbabwe. Both units of Eluwa and Oshinanena are not conveniently installed; the dehuller and hammer mill cyclones are not fitted through the roof and blew the dust inside the milling room!
Roller mill versus combined dehuller - hammer mill:
Roller milling of Mahangu was performed at the Onipa Parish some years ago and more recently at Mahanene Research Station, but both are now discontinued. The advantage of processing millet with a roller mill is to combine the two processes of dehulling and milling in a continuous flow operation. For small scale operations, roller mills have disadvantages: they are more complex machines to set up, operate and maintain; and require clean grain (a piece of metal in the grain would seriously damage the rollers).

Hammer mills: Machines from South Africa, Zimbabwe, Botswana and local ones are available and used. The Drotsky hammer mills have the double advantage of being available in the widest range of capacities and power sources (electric, petrol, diesel, tractor PTO) and backed up by a field service and repair agent based in Oshakati. For the other machines, no such agent so far exists in the 4 O’s.

Dehullers: There is so far no Namibian dehuller and equipment has been imported mainly from Zimbabwe and Botswana, as well as Japan. To our knowledge there is no specialised installation and maintenance agent for the Zimbabwe and Botswana machines (most spares are anyway standard and can be found locally relatively easily). The Japanese dehullers have a smaller capacity but have the advantage of operating on continuous flow. Twenty of these machines (half with diesel air cooled engines, half with 3 phased electric motors) were donated to MAWRD in 1992 but do not seem to be used, except at Mahanene. The manuals and spares are said to be stored at the Grootfontein Extension Office.

Grain cleaner and grader: This equipment could be very useful for Mahangu commercial milling units. Small scale and affordable machines are not available on the local market but could be easily manufactured. Tanroy Engineering in Harare has developed a small scale hand operated winnower and Precision Grinders is manufacturing in Zimbabwe under a UK company license a medium scale (3 - 8 T/h) precleaning and cleaning/grading machine.

3.3 Competition Between Mahangu and Maize, Mahangu Flour Demand:

In the 4 O’s, even if Mahangu is the preferred cereal staple food and is widely grown by farmers, white maize is imported into the 4 regions on a regular basis in the form of processed maize meal and grain (locally milled and distributed by several private businesses). Maize demand depends largely on the level of the Mahangu harvest of the year, in a "drought year" households will depend more on maize for satisfying their food requirements. Maize demand also varies along the year with a pick demand starting usually in January and stretching to the Mahangu harvest (around May).

In this regard, maize meal has advantages over Mahangu; it is available all around the year in urban and rural areas, well distributed through a competitive network of wholesalers, supermarkets and small shops, and is sold at stable and attractive prices compared to available local Mahangu flour or even grain.

---

20 ROVIC in Grootfontein declared its intention to develop and manufacture a local dehuller, but no clearer indications was provided at this stage.

21 Mr L. von Maltitz, pers. comm.
The price competitiveness of Mahangu against maize (and also imported Mahangu) is a key element for the development of the local Mahangu market (including processing). But, it is not clear what is the price elasticity of the demand for Mahangu, especially when consumers are dominated by producers.

3.3.1 Maize Meal Consumption:

The average annual maize meal consumption is estimated at 55 - 70 kg per person for the North Central Regions\textsuperscript{22}. The total annual consumption of maize meal in these 4 Regions is estimated by ourselves between approximately 15 000 to 45 000 tonnes depending on the year.

There are different standard qualities of industrial maize meal, unsifted, sifted, special sifted, ..., to which must be added the "out of standard" maize flour produced in the North by the small and medium scale businesses (sometimes referred to as "bush mills"). This maize meal is produced from whole maize grain just hammer milled and we tentatively chose to call it "hammermilled whole maize meal".

These growing small/medium scale commercial milling businesses\textsuperscript{23} are highly competitive in comparison to the large scale industrial mills as they provide cheaper products (Tables 4.A & 4.B) of a different quality, but accepted by a significant proportion of the local market customers.

Namib Mills - Otavi is the main supplier of industrial maize meal to 4 O's regions. The Otavi Mill's last annual production of white maize flour was around 17 - 18 000 tonnes (July 1996 to June 1997) and 60 % of it (10 - 11 000 T) was supplied to the 4 O's. Only small quantities are directly exported by Namib Mills to Southern Angola\textsuperscript{24}.

Maize meal demand normally starts dropping in May while it is not the case for bread flour.

Namib Mills' biggest seller is the unsifted meal (Namib Sun) over the special sifted one (Top Score) which is supplemented in vitamin A. The unsifted / sifted maize meal proportion is on annual average 55 % and 45 % respectively. These percentages vary within the year following the pattern of home consumption of Mahangu from homestead stocks.

Namib Mills decreased its price for unsifted maize meal in July this year by 10 % at Otavi (from N\$ 70 to 63 for a 50 kg bag). This is attributed to the regionalisation of maize prices and the consequent decrease of the maize import parity price.

\textsuperscript{22} The national annual per capita maize meal consumption average is 65-70 kg (Source: Namib Mills). For the poorest half of the overall Namibian population, the average expenditure on maize meal is approximately 16% of their total household expenditure. In the Northern regions expenditure on maize meal as a proportion of total expenditure is two and half times that of the whole of Namibia. Thus the poorest half of households in Northern Namibia spend around 40% of their household budget on maize meal (Alan Low).

\textsuperscript{23} Such as Eluwa Wholesalers, Punyu, Etoha Mills in Otjio, ...

\textsuperscript{24} According to the Otavi Manager, yellow maize is preferred in Angola (Mr P. Göttert, pers. comm.). Undetermined quantities of maize meal supplied to the Northern Regions are exported to Southern Angola.
3.3.2  Maize Meal Prices:

The two tables below summarise a brief price survey conducted in the North.

**Table 4.A  Sifted maize meal prices (August - October 97)**

<table>
<thead>
<tr>
<th>Sifted Maize Meal (Top Score)</th>
<th>2,5 kg</th>
<th>5 kg</th>
<th>12,5 kg</th>
<th>50 kg</th>
<th>N$ / T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholesale price at Namib Mills Otavi (excl. GST)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wholesale price at Namib Mills depot at Ondangwa (excl. GST)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retail price at Amcom Supersave Oshakati (different packaging)</td>
<td></td>
<td></td>
<td>99,35</td>
<td></td>
<td>1 987,00</td>
</tr>
<tr>
<td>Retail price at Yetu Sentra Oshakati (different packaging)</td>
<td></td>
<td></td>
<td>26,35</td>
<td></td>
<td>2 108,00</td>
</tr>
<tr>
<td>Onesi Branch shop (NNFC)</td>
<td></td>
<td></td>
<td>15,50</td>
<td></td>
<td>3 100,00</td>
</tr>
</tbody>
</table>

**Table 4.B  Unsifted and hammermilled whole maize meal prices (August 97)**

<table>
<thead>
<tr>
<th>Unsifted &amp; Whole Maize Meal</th>
<th>10 kg</th>
<th>12,5 kg</th>
<th>20 kg</th>
<th>50 kg</th>
<th>N$ / T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Namib Sun at Namib Mills Otavi wholesale price (excl. GST)</td>
<td>16,85</td>
<td>63,00</td>
<td></td>
<td></td>
<td>1 348,00</td>
</tr>
<tr>
<td>Namib Sun at Namib Mills depot at Ondangwa (excl. GST)</td>
<td></td>
<td>69,00</td>
<td></td>
<td></td>
<td>1 380,00</td>
</tr>
<tr>
<td>Eluwa maize meal at Eluwa Wholesales (retail price)</td>
<td>17,00</td>
<td></td>
<td></td>
<td>65,00</td>
<td>1 700,00</td>
</tr>
<tr>
<td>Namib Sun retail price Oshakati (Yetu Sentra/Supersave)</td>
<td></td>
<td>19,95</td>
<td>74,75</td>
<td></td>
<td>1 495,00</td>
</tr>
<tr>
<td>Number One retail price Oshakati (Yetu Sentra/Supersave)</td>
<td>16,20</td>
<td>31,40</td>
<td></td>
<td></td>
<td>1 570,00</td>
</tr>
<tr>
<td>10 Unsifted retail price Oshakati (Yetu Sentra)</td>
<td></td>
<td>16,20</td>
<td></td>
<td></td>
<td>1 296,00</td>
</tr>
<tr>
<td>Ompundja Branch shop (NNFC)</td>
<td></td>
<td></td>
<td></td>
<td>80,00</td>
<td>1 600,00</td>
</tr>
<tr>
<td>Eluwa maize meal</td>
<td>21,85</td>
<td></td>
<td></td>
<td></td>
<td>2 185,00</td>
</tr>
</tbody>
</table>

3.3.3  Mahangu Flour Parity Prices:

When looking for a parity price between Mahangu flour and maize meal, it is not appropriate to set only one maize meal reference price, because of the different qualities of maize meal as presented above. Likewise, Mahangu flour could be of different qualities and be set at different price levels.
For this purpose, the following criteria have been used:
- Different packaging in 2.5, 5, 10, 12.5, 20 and 50 kg
- Calculated wholesale price (assuming a 10% retail mark-up) at Oshakati, including GST\textsuperscript{25}.

It must be noted that packs of 12.5 or 10 kg are most often the highest volume sellers and often retailed at a lower mark-up than larger and smaller packs.

a) \textit{Hammermilled whole maize meal}: (based on Eluwa price)

\begin{align*}
\text{N} \ 1,300 \ / \text{T} & \text{ in 50 kg bags} \\
\text{N} \ 1,500 \ / \text{T} & \text{ in 20 kg bags} \\
\text{N} \ 1,700 \ / \text{T} & \text{ in 10 kg bags} \\
\end{align*}

b) \textit{Unsifted maize meal}: (based on Oshakati supermarket prices for Namib Sun / Number One and compared with Namib Mills Ondangwa depot prices, delivered to Oshakati at N\text{S} 15,00 /T, + GST)

\begin{align*}
\text{N} \ 1,360 - 1,380 / \text{T} & \text{ in 50 kg bags} \\
\text{N} \ 1,425 - 1,430 / \text{T} & \text{ in 20 kg bags} \\
\text{N} \ 1,450 - 1,470 / \text{T} & \text{ in 12.5 - 10 kg bags} \\
\end{align*}

c) \textit{Sifted maize meal}: (based on Oshakati supermarket prices for Top Score and compared with Ondangwa Namib Mills prices, delivered to Oshakati at N\text{S} 15,00 /T, + GST)

\begin{align*}
\text{N} \ 1,800 - 1,820 / \text{T} & \text{ in 50 kg bags} \\
\text{N} \ 1,740 - 1,950 / \text{T} & \text{ in 12.5 kg bags} \\
\text{N} \ 2,070 - 2,145 / \text{T} & \text{ in 2.5 - 5 kg bags} \\
\end{align*}

These rough calculations are consistent with the pricing of Eluwa for its new Mahangu meal product. It appears that the Eluwa Mahangu meal pricing is set a little bit above unsifted maize meal, except for the 10 kg packaging set much higher.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|}
\hline
\textbf{Mahangu Flour} & \textbf{10 kg bag} & \textbf{20 kg bag} & \textbf{50 kg bag} \\
\hline
\textbf{Price per bag} & 17,00 & 29,00 & 69,00 \\
\textbf{Equivalent price N\text{S} /T} & 1,700,00 & 1,450,00 & 1,380,00 \\
\hline
\end{tabular}
\caption{Eluwa Wholesale Prices for Mahangu Meal (Oct. 1997)}
\end{table}

3.3.4 \textit{Mahangu Flour Demand - Quantities and Quality}:

In the absence of any consistent Mahangu flour marketing experience in the 4 O’s, it is difficult to predict how the customers would react to quality and prices of the product. It is as well hard to forecast what portion of the maize meal market could be displaced by the nascent Mahangu industry.

\textsuperscript{25} Mahangu and Mahangu products are exempted of GST, maize mealie meal is not and GST must therefore be included to compare prices.
In terms of packaging, the popular 10 or 12.5 kg bags should be targeted for Mahangu flour. In addition, smaller packs of 5 and/or 2.5 kg could be convenient especially at the launching of the product.

In terms of prices, most urban salaried customers approached were expecting a Mahangu flour at parity or a bit cheaper than sifted maize meal and declared that in this case they would go for it. However on account of the proportion of unsifted maize meal and the increasing quantities of hammermilled whole maize meal being consumed in the urban and rural markets, it seems obvious that the poorer segments of the consumer market will go for the cheapest cereal source, which could be the non sifted maize meal or Mahangu grain to be processed manually at home or brought to a service mill.

Based on the figures obtained during our brief research, the following estimates are made for the annual maize meal consumption, which could be partly “taken over” by Mahangu flour:

- Sifted maize meal: 45% of 10 to 15 000 T 4 500 to 6 750 T
- Unsifted maize meal: 55% of 10 to 15 000 T 5 500 to 8 250 T
- Hammermilled whole maize meal: (estimated from installed capacity) 5 000 to 10 000 T

In terms of quality of Mahangu flour, any guess is even more difficult to formulate in the absence of specialised market research and market trials in the 4 O’s. To illustrate this difficulty, several possible qualities of Mahangu flour are proposed below. In addition the flours obtained from Okashana, traditional varieties or a mixture of the two do not have the same colour and taste ...

- Whole hammermilled Mahangu flour: might not be appreciated for cooking Oshifima but is acceptable for preparing the traditional drinks and brews.

- Decorticated Mahangu flour (dehulled and hammer milled or roller milled) from low to high extraction rates (the higher the extraction rate the better the shelf life of the product): the finer flour (0,8 mm sieve) seems the most appreciated but would be more expensive to produce, the same applies to the level of decorticating.

- Fermented decorticated Mahangu flour: a process reproducing the traditional wet processing of Mahangu and giving the flour a specially appreciated taste; the mechanisation of this processing is possible but may bring handling and hygienic difficulties, and be much more costly to produce. Moreover, the shelf life of the product may be limited if the product is not correctly dried before packaging; and the drying would certainly increase further the production costs.

3.3.5 Maize Market Price Trends:

The above figures based on current prices should not be taken as a long term reference since the market trends are on the reduction of the maize producer prices. The 1997 maize price was already 15 % lower than the years before and a further decrease of 15 % (or more) is conceivable for the near future. In terms of import parity prices, the calculation below would give some indication of future prices with a 15 % decrease. This would have implications on the maize parity price for Mahangu grain and Mahangu products.
Table 5. White Maize Guideline Prices of 1997 and Projection

<table>
<thead>
<tr>
<th>White maize prices NS/T</th>
<th>Oshakati</th>
<th>Otavi</th>
<th>Windhoek</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997 guideline price</td>
<td>920,00</td>
<td>850,00</td>
<td>785,00</td>
</tr>
<tr>
<td>Future (- 15 %)</td>
<td>800,00</td>
<td>740,00</td>
<td>680,00</td>
</tr>
</tbody>
</table>

Conclusions No 4 for NNFC Mahangu Marketing

a) The recent development of Mahangu commercial milling should be closely followed by NNFC not only in terms of competition with these private commercial milling ventures, but also for the opportunity it creates in opening the local market for such new product.
b) A range of tested processing equipment is available on the local and regional markets; NNFC could request of the MAWRD the use of some Japanese dehullers (so far not utilised), at least as a short term support measure to initiate a Mahangu processing activity.
c) The milling of maize is technically possible with Mahangu processing equipment consisting of a dehuller and hammer mill.
d) Locally produced Mahangu meal could significantly replace a significant part of the sifted and unsifted maize meal consumption if its price is competitive (and quality acceptable to consumers).
e) The presently installed capacity of Mahangu commercial mills in the 4 O’s does not saturate the potential demand for Mahangu meal; there is room for a co-operative to start operating in this venture as soon as possible.
f) The wholesale pricing of Mahangu meal between unsifted and sifted maize meal wholesale prices seem commercially appropriate; smaller packaging of the product in 10 - 12.5 kg bags or less should be suitable and could bring a better return for retailing.
g) Retailing of Mahangu meal through the co-operative Head Office (in urban area) and Branch shops (in rural areas) could also be competitively organised.
h) On a longer term basis, Mahangu grain and Mahangu products would have to follow the declining price trends of the maize market.
i) In years of deficit Mahangu production, a commercial milling business may have to rely on importing millet grain to sustain production or switch to maize milling.
4. **FINDINGS: INVOLVEMENT of NNFC in MAHANGU GRAIN MARKETING AS a CO-OPERATIVE**

4.1 **Supply of Mahangu Grain at NNFC Branch Level:**

4.1.1 The two issues of Mahangu price and marketable surplus quantities were discussed at the first meeting with the NNFC Board (27/07/97).

On the issue of marketable prices for Mahangu grain, different levels were considered and discussed taking into account the competitiveness of Mahangu surplus against maize grain and mealie meal.

<table>
<thead>
<tr>
<th></th>
<th>Price N$/T</th>
<th>Price N$/kg</th>
<th>Equivalent N$/lata</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRN drought relief:</td>
<td>1 450,00</td>
<td>1,45</td>
<td>21,00</td>
<td>Scheme terminated</td>
</tr>
<tr>
<td>&quot;Church fees&quot;</td>
<td>1 200,00</td>
<td>1,20</td>
<td>18,00</td>
<td>Small quantities, not a marketing scheme</td>
</tr>
<tr>
<td>(payment in kind):</td>
<td>1 130,00</td>
<td>1,13</td>
<td>17,00</td>
<td></td>
</tr>
<tr>
<td>Maize grain parity</td>
<td>920,00</td>
<td>0,92</td>
<td>14,00</td>
<td>Approx. parity price for Mahangu grain</td>
</tr>
<tr>
<td>(in Oshakati):</td>
<td></td>
<td></td>
<td></td>
<td>delivered to Oshakati</td>
</tr>
<tr>
<td>Maize parity price</td>
<td>800,00</td>
<td>0,80</td>
<td>12,00</td>
<td>Approximate parity price for Mahangu grain</td>
</tr>
<tr>
<td>less delivery cost:</td>
<td></td>
<td></td>
<td></td>
<td>at Branch level</td>
</tr>
<tr>
<td>(to Oshakati)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Resolution:**  
( NNFC Board, 27/07/97)

1. A provisional Mahangu price of N$ 800,00 per tonne (or N$ 0,80 per kg) at branches should be promoted by NNFC as feasible for any competitive marketing of surplus in sizeable quantity.

2. Such marketing service by NNFC should be done with prices in kg (and not in lata).

3. Intake should be done in bags (50 kg size bags) at Branch level.

4. A price of N$ 40,00 per 50 kg bag should be publicised (equivalent to the N$ 0,80 /kg).

Board members were tasked to inform in their respective branch, the members (and farmers' community in general) about price options for surplus Mahangu and register willing sellers at the "feasible" price level agreed at the NNFC Board meeting. To assist in this process an information and discussion tour of the branches was organised with the NNFC Exco and the consultants.

The registration exercise to be carried out by the branches would be an important test not only of the capacity of the branch Management Committees to organise such a process but also of the willingness of the membership (actual and potential) to market their surplus through the co-operative.
4.1.2 Results of NNFC grain surplus registration:

The first figures obtained a few weeks later from NNFC Branches were as follows:

<table>
<thead>
<tr>
<th>NNFC Branch</th>
<th>Total quantity (T)</th>
<th>Total number of farmers</th>
<th>NNFC members: quantity (T)</th>
<th>NNFC members: number</th>
<th>Non-members: quantity (T)</th>
<th>Non-members: number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Okahao *</td>
<td>± 27,23</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onesi</td>
<td>19,22</td>
<td>125</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tsandi</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ogongo **</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ompundja</td>
<td>43,24</td>
<td>68 + 7 = 75</td>
<td>19 + ?</td>
<td>49 + ?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>± 90, -</td>
<td>221</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: * Estimated quantities calculated from data in latas and Omashlisha (traditional granaries).
** No information from Ombambi and Elim emerging branches; no information meeting at Ogongo.

Additional registration was obtained at end of September 1997:

<table>
<thead>
<tr>
<th>NNFC Branch</th>
<th>Total quantity (T)</th>
<th>Total number of farmers</th>
<th>NNFC members: quantity (T)</th>
<th>NNFC members: number</th>
<th>Non-members: quantity (T)</th>
<th>Non-members: number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Okahao *</td>
<td>37</td>
<td>N/A</td>
<td>37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onesi *</td>
<td>6</td>
<td>N/A</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tsandi</td>
<td>60</td>
<td>N/A</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ompundja</td>
<td>15</td>
<td>N/A</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non members</td>
<td>350</td>
<td>N/A</td>
<td>350</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>± 468</td>
<td>118</td>
<td>350</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: * Tonnage estimated from data in latas and Omashisha (traditional granaries).

4.1.3 Comments: (from the above table)

- Farmers got used to registering surplus for selling with the NDC drought Mahangu buying scheme (last registration in 1996/97) and being paid some 2 months later. We believe that the information about the NNFC minimum price of N$ 0,80 per kg was well understood by farmers during the registration process. For these reasons the above figures can be taken as a reliable indicator of the commitment of farmers to sell at that price.
- But the figures of quantities might not be fully accurate; most figures are based on lata (+/- 15 kg) and granary (roughly estimated at an average of 1 T\textsuperscript{26}) data which could not be physically checked by the consultants.

- The figures were collected during the months of August and September, at a time when all farmers may not have decided to sell or not\textsuperscript{27}.

- The limited quantity of Mahangu surplus registered by Branch members (around 200 T) has important implications:
  - It is manageable as a first NNFC grain marketing experience;
  - Such volume of tradable grain cannot justify much investment (material or human), if the cost is to be recovered by the co-operative (limited economy of scale);
  - Non-member business (350 T) may overcome normal co-operative service to members.

4.1.4 Reactions of Farmers to Mahangu Marketing and Prices at Branch Meetings:

The reactions were very similar in the different branch meetings and are summarised as follows:

- Most participants did not know the current maize grain price (or the NAB guideline price at Oshakati), but were interested in getting the information;

- Some hostile reactions to Mahangu price at a comparable level with maize prices were noted, especially from non-members of NNFC who attended the meetings;

- Different justifications of this hostility were expressed as follows:
  a) Mahangu is more nutritious and appreciated than maize, and should therefore cost more;
  b) The production of Mahangu is more labour intensive than maize, as the maize price is fixed by other people, the Mahangu price should be set by the Mahangu farmers;
  c) Maize and Mahangu cannot be compared, Mahangu has a different (i.e. higher) value;
  d) With Mahangu unlike maize the bran can be further used for other foods; and
  e) GRN drought scheme and "Church congregations' lata" prices are used as market price reference;

Comparison was also made to Meatco cattle marketing prices considered as too cheap;

- Most NNFC members nevertheless accepted to consider Mahangu price at parity with maize price, especially in a year of surplus production;

- N\$ 40,00 per 50 kg bag (at Branch level) was considered as a minimum price; prices around N\$ 45,00 to 50,00 were considered much more acceptable (equivalent to N\$/lata: 13,5 to 14,00);

- Participants were not familiar with marketing costs, especially delivery costs to buyer;

\textsuperscript{26} Omashisha are said to usually contain between 45 latas (675 kg) and 130 latas (1950 kg).

\textsuperscript{27} As mentioned earlier in the report, the main Mahangu selling period is from October to May.
- Some participants considered that it was not the right time to talk about selling Mahangu (too early, prices expected to rise later on ... ?), some others declared that it was the time to see who wants to sell and who wants to keep all his/her grain;

- Some participants recalled surplus Mahangu that went rotten because of poor storage during the rainy season and stocks not sold at expected high price;

- At Tsandi, people recalled past experience of milling Mahangu for selling (at a higher price), which remained unsold and got spoiled while maize mealie meal was still bought in the local shops;

- A price of N$ 70,00 for 50 kg Mahangu flour (N$ 1 400,00 /T) was mentioned as acceptable in one meeting (Okahao).

- It was mentioned by the local area Agricultural Extension Technician (at 2 places) that the Government should rather set a fixed price for every farmer.

It was not possible for the consultants in such a short assignment to directly reach all households and discuss marketable surplus quantities and price scenarios. This exercise should be conducted over a much longer time frame and a wider geographical area. We nevertheless would like to propose some elements of a "communication strategy" as suggested to the consultants at the last MMIU Steering Committee meeting in Oshakati on 10/07/97.

---

**Recommendations for a Communication Strategy on Mahangu Marketing and Prices**

**(in a year of surplus production)**

- More information and debates should be devoted to the question of Mahangu marketing in a year of surplus production: grain market and trade liberalisation policy, maize parity prices in the 4 O's, competition with the maize industry, agri-/cultural value of Mahangu as the local staple food, ...

- It is clear that the "government price" of Mahangu used during the drought relief buying scheme has drawn some unrealistically high price expectations not only with farmers but also with urban grain traders. A clear message on the drought scheme has to be extended to Northern Regions.

- Marketing price information should be provided in kg or in bags (as marketing units) and not in lata as this measurement is associated to micro-local barter or trading and to payment in kind of church fees.

- It is crucial that various communication channels are used over a significant period of time (until at least the coming planting season): media's, public meetings and debates, community meetings, etc. through political leaders, Councillors, government officers, NGOs and community leaders and most certainly private sector representatives involved in the milling and food industry.

- It is furthermore essential that information be directed at communities in rural areas and that discussions and debates do not only take place once in large towns such as Oshakati.
4.1.5 Conclusion on the supply of Mahangu grain at NNFC Branch level:

At a minimum buying price of N$ 0.80 /kg, NNFC could market in a relatively short period of time an estimated quantity of between 200 to 550 T of Mahangu grain. The exact quantity would only be ascertained when the grain is bagged and delivered to the NNFC Branch intake points.

4.2 Grain Marketing at NNFC Branch Level:

The NNFC Branch centres are here considered as the main intake points for Mahangu grain bags in the envisaged NNFC marketing scheme. This does not mean that temporary storage cannot be used in sub-centres around the Branch centres.

4.2.1 NNFC Branch Storage Facilities:

In summary the shop storage facilities are as follows (see details in ANNEX XII):

<table>
<thead>
<tr>
<th>NNFC Branch shop</th>
<th>Appropriateness of shop building for bags storage</th>
<th>Total floor size in m²</th>
<th>Estimated maximum bags storage capacity</th>
<th>Other local storage possibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Okahao</td>
<td>Acceptable (but space very limited)</td>
<td>45 m²</td>
<td>50 bags (2.5 T)</td>
<td>- Community Hall</td>
</tr>
<tr>
<td>Onesi</td>
<td>Inappropriate bldg for storage</td>
<td>70 m²</td>
<td>0</td>
<td>- Community Hall</td>
</tr>
<tr>
<td>Tsandi</td>
<td>Inappropriate bldg for storage</td>
<td>25 m²</td>
<td>0</td>
<td>- Community Hall</td>
</tr>
<tr>
<td>Ompundja</td>
<td>Appropriate (but space limited)</td>
<td>80 m²</td>
<td>100 bags (5 T)</td>
<td>- Agric. Ext. storeroom - Private storage (?)</td>
</tr>
</tbody>
</table>

NNFC shops are inadequate for storing more than very a limited number of grain bags.

This constraint could be (partly) overcome by using either rooms in Community Halls available in Okahao, Onesi and Tsandi or private facilities as for Ompundja. But these storage facilities might only be available for a relatively short duration (that is a few weeks for the temporary storage of pooled bags before being marketed). MAWRD Extension office storerooms in NNFC Branches are quite small and might not be available (even before the agricultural inputs are delivered there for the coming ploughing season).

Before the rainy season, outside storage on poles (without cover ?) is possible for a limited period, especially in Ompundja (the shop yard is fenced off) and possibly in Okahao, both Branch shops having a night security guard.
4.2.2. Other Facilities and Personnel at NNFC Branch Level:

Other facilities are rudimentary and only located in the co-operative shops. Okahao and Onesì shops have informal electric connections for light. Ompundja area is not connected to the electricity grid. For marketing and processing purpose, NNFC branches do not possess any scale, tarpaulin cover (sails), trolley, milling machine, etc.

All four NNFC branches have a shop salesperson trained in basic recording and bookkeeping (Onesi seems to have 3 part time shop keepers on a very unclear rotation basis). Shop keepers are not very busy at this time of the year and could, with proper assistance from Branch MC members, handle the basic management of grain bag intake (see details below).

4.2.3. Branch Working Capital and Shops:

In theory the Branch working capital available for co-operative service activity should be derived from the accumulated paid-up share capital (plus any surplus and minus any loss ...) from Branch members. Some difficulties make the actual situation not so clear (and this needs to be addressed, see below).

In any case the paid-up share capital at Branch level is too small an amount to finance the co-operative Mahangu marketing service and pay cash to the members / farmers on the spot for more than a few tons.

<table>
<thead>
<tr>
<th>Branch</th>
<th>Nb of paid-up members</th>
<th>Total share capital (N$ 50/Mb)</th>
<th>Equivalent T of Mahangu at N$ 800/T</th>
<th>Equivalent nb of 50 kg bags</th>
</tr>
</thead>
<tbody>
<tr>
<td>Okahao</td>
<td>82</td>
<td>4 100,00</td>
<td>5,13</td>
<td>102,5</td>
</tr>
<tr>
<td>Onesì</td>
<td>44</td>
<td>2 200,00</td>
<td>2,75</td>
<td>55</td>
</tr>
<tr>
<td>Tsandi</td>
<td>53</td>
<td>2 650,00</td>
<td>3,31</td>
<td>66</td>
</tr>
<tr>
<td>Ompundja</td>
<td>104</td>
<td>5 200,00</td>
<td>6,50</td>
<td>130</td>
</tr>
</tbody>
</table>

Furthermore, the Branches are supposed to have transferred 10% of the share capital and annual fees to the Head Office. The last NNFC Congress resolved that this contribution to the HO be increased to 25% (and the share capital be increased from N$ 50,00 to 55,00 and the annual fee from N$ 30,00 to 35,00).

The cash on hand (cash box + bank) situation is probably very similar but it is difficult to exactly know as we have not been able to see any Branch financial books. The “Provisional Financial Report” of the last NNFC Congress of May 1997, shows figures of ‘Actual Final Capital’ (sic) as follows:
Table 9. Available Capital at End of Financial Year: NNFC HO and Branches

<table>
<thead>
<tr>
<th>Branch</th>
<th>Stock (N$)</th>
<th>Bank + cash</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ompundja</td>
<td>2 924</td>
<td>8 351</td>
<td>11 275</td>
</tr>
<tr>
<td>Onesi</td>
<td>1 775</td>
<td>7 658</td>
<td>9 434</td>
</tr>
<tr>
<td>Okahao</td>
<td>1 674</td>
<td>10 527</td>
<td>12 201</td>
</tr>
<tr>
<td>Head Quarters</td>
<td>-</td>
<td>-</td>
<td>4 873</td>
</tr>
</tbody>
</table>

It must be borne in mind that most of the branch capital is tied up in the NNFC shop trading project supported by the NNRDP. The French Government Co-operation granted some N$ 13 000 per shop as initial capital in 3 Branches (Okahao, Onesi, Ompundja); and each branch was expected to allocate a 30% cash contribution of some N$ 5 000 to the shop ‘revolving fund’.

Without entering into any analysis of the problems and successes of the NNFC co-operative shops, which is beyond the scope of this study, it must be noted that the economic results of the shop trading activity is so far negative. It means that the shops revolving funds are getting slightly depleted, which has direct implications on the availability of the Branch liquid assets as working capital for other activities.

It is unfortunately not possible to comment further on the financial situation of the co-operative and the economic results of its services as NNFC Branches books were not examined by the consultants. The NNFC Head Office does not have proper consolidated books and records for the last financial year (ending May 1997?). This worrying state of affairs must be addressed as a matter of urgency by NNFC possibly with the assistance of the Division of Co-operative Development and in co-operation with the NNRDP.

The consultants wish to point out some important weaknesses and shortcomings, which would affect any future development of NNFC:

- To our knowledge, there is no audited financial statement of NNFC for the 1996/97 financial year. If NNFC applies to a lending institution for a loan, it will be asked for a proper income and expenditure statement and balance sheet. The provisional financial statement presented at the last Congress has an improper format and wording, is incomplete, and only deals with the 3 Branches the shops of which are supported by the NNRDP.

- Branch financial reports (and books) should be developed in a way that would make the shop accounts a component of the Branch activity and not the contrary.

- NNFC HO and Branches do not operate under any budget.

- Further co-operative book keeping training should be extended to Branches and HO once a simplified but formalised accounting system is devised to suit the present and future needs of NNFC.

---

28 With low turn over and high mark-up on goods retailed, it is not surprising that negative returns are obtained. The shop activity should rather be considered as a training exercise for as long as the member co-operative share capital does not get eroded and become no more available for co-operative services.

29 The last AGM took place on the 24th May 1997. The NNFC by-laws indicate that the financial year shall end on the last day of June.
4.2.4. **NNFC Branch Management of Intake:**

The management of the Mahangu grain intake was discussed at two occasions in a Board meeting on 17/08/97 and in an Exco meeting on 20/08/97. Below is a summary of the discussions.

**a) Supply of empty bags:**
Members wanting to market Mahangu through the co-operative might not have enough empty bags for their grain. NNFC could supply through its shops 50 kg polypropylene woven bags. There is a limited quantity of good second hand 50 kg bags available in Oshakati (mainly from the companies milling maize in town). These go for N$ 1,00 each.

The alternative is to procure new 50 kg bags (UV protected) from Swakopmund. A quotation for 100 bags delivered to Oshakati was obtained (see Annex); a cheaper price could be obtained for a larger order.

* Quick price calculation: N$/bag
  - Landed cost in Oshakati for 1 bag: 1,27
  - NNFC HO mark-up 25%: 0,33
  - Wholesale price to Branches: 1,60

The retail price of new bags to members may reach N$ 2,00 per bag at the shops (after adding transport and shop mark-up), which would represent a cost of 5% of the selling value of a bag (at N$ 40,00).

Needles and threads for sewing bags could be added as items retailed by shops if there is a demand for them.

**b) Delivery by farmers at Branch centre and temporary storage:**
Farmers will have to deliver their bags to the Branch centre where the storage is arranged. The intake will be organised by the shop keeper assisted by some MC members. Specific intake days have to be announced.

As the delivery of bags by some member-farmers to the main intake point might be constrained by lack of transport, a Branch may arrange an additional service by organising a decentralised transport service by hiring private vehicles. It is important for the Co-operative, the Branches and the members to realise that this would be an additional service the cost of which would have to be recovered by the Branch. The co-operative transport price to be charged to farmer-members by the Branch might not necessarily be cheaper than the price farmers may secure by individual arrangements.

**c) Weighing:**
It was decided that the marketing scheme will be carried out in 50 kg bags and payment made per kg. But at present Branches do not have scales and it might not be possible to find this equipment in the villages. Four options were considered for Branches to check and record the weight of bags:
1) ‘No bothering’: The buyer might not be satisfied without knowing the exact quantity on sale; it may also bring difficulties in paying the farmers and subsequently lead to disputes.

2) **Buying a scale:** Could be a useful investment for a Branch, but an accurate platform scale is expensive; might not be a priority at this stage especially if the quantities traded are limited.

3) **Measuring stick:** This is the method successfully used by Likwama local Associations by which a marked stick is pushed into the grain to the bottom of the bag and the kg measurement read on the stick at the grain surface level; the stick must be accurately marked for measurements between 45 and 55 kg checked on a scale (obviously a measuring stick can only work for a certain type of bag size and type of grain).

4) **Lata measurement:** The ‘traditional’ measurement could be used and bags filled with 4 latas (4 x 15 kg), approximately 60 kg.

d) **Grading and quality control:**
Grading of Mahangu grain according to NAB standards might not be necessary except if it is a requirement of the buyer. The MMIU has the necessary grading equipment (2 sieves, portable scale, sampling spear, containers) and is ready to demonstrate the grading of Mahangu grain to NNFC Branches. Moisture content may not be a problem before the rainy season.

It should be important for Branches to inform properly its members about the quality of grain required: from this year harvest, no insect infestations or grain damage and no foreign matter such as sand, dust and pieces of chaff.

e) **Recording:**
Simple recording of deliveries shall be kept at the Branch intake point. Below is a model of record sheet:

<table>
<thead>
<tr>
<th>Date of intake</th>
<th>Name of farmer</th>
<th>ID number</th>
<th>Village</th>
<th>Number of bags</th>
<th>Total kg</th>
<th>Signature of farmer</th>
<th>Signature of Branch</th>
</tr>
</thead>
<tbody>
<tr>
<td>20/08/97</td>
<td>Mr A. Iita</td>
<td>...</td>
<td>Okahao</td>
<td>20</td>
<td>1 000,00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The delivery recording shall be done accurately as it will be used to pay the farmers according to their deliveries, and possibly distribute a bonus to members.

f) **Branch marketing: preliminary costing and pricing**
A Branch selling price shall be set for marketing the grain bags either through the NNFC HO or directly to a buyer who would load bags at the Branch.
The costs might depend on the specific arrangements made at the Branch. An indicative cost structure is as follows:

\[
\begin{array}{l|c|c}
\text{Buying price:} & N\$/\text{bag} & 40,00 \\
\text{- Gross mark-up:} & & \\
\hspace{0.5cm} (5\% \?) & & \\
\hline
& \{ \text{storage cost:} & \pm 0,50 \text{ (including security)} \\
\text{Branch selling price:} & \{ \text{casual labour:} & \pm 0,33 \text{ (intake and loading) *} \\
& \{ \text{stationery:} & \pm 0,02 \\
& \{ \text{overheads/surplus:} & \pm 1,15 \\
\end{array}
\]

* Note on the calculation: 8 casuals paid N$ 10,00 each for an intake of 30 T \hspace{0.5cm} \text{(sub-total: N$ 80,00)}
8 casuals paid N$ 15,00 each for loading a 30T truck \hspace{0.5cm} \text{(sub-total: N$ 120,00)}
Total cost of 80,00 + 120,00 = N$ 200,00 for 30 T \hspace{0.5cm} \text{N$ 6,66 / tonne = N$ 0,33 / bag}

\[g\) Price to members and non-members:
It was considered important to give priority to members in the marketing service and pay non-members less than members. As N$ 40,00 per bag is considered the bottom line, members could be offered a bonus of say N$ 2,00 per bag, payable afterwards when all costs have been taken into account. But it is important to note that this is only possible if the selling price can be raised or savings realised on the costs.

4.3 Grain Marketing by NNFC Head Office:

4.3.1. Role of the Head Office:

In order to secure a large order from a buyer, the co-operative may have to pool grain bags from different Branches. The Head Office would play the roles of negotiating the contract, coordinating the intake in the Branches and deliveries to Oshakati, organising the transport and off-loading in Oshakati central storage (or straight delivery to the buyer).

In this event, the HO has to administer the contract, get the payment from the buyer and distribute to the Branches their dues.

4.3.2. NNFC (HO) marketing: preliminary costing and pricing:

A selling price in Oshakati has to be devised based on cost recovery and competitiveness with the maize grain price.

The selling price shall be set realistically by adding a co-operative HO mark-up (to cover overheads and possibly generate a small net surplus). The standard NNFC HO mark-up of 20% used for the supply of the Branch shops might be too high.
Costs  
- Purchase price from Branch: 42,00  
- Transport cost to Oshakati: 3,75  
- Off-loading and loading: 0,35  
- Central storage and handling: 0,50  

Total costs: 46,60  

$\textit{N/T}$  
840,00 (including loading)  
75,00 (average by large truck)\textsuperscript{30}  
7,00 (see note above)  
10,00 (average of N$ 300 for 30 T for 1 month)  

\textit{Free On Truck (FOT) Oshakati}  

<table>
<thead>
<tr>
<th>Selling price</th>
<th>NNFC Head Office Mark-up</th>
<th>At cost (0 %)</th>
<th>Maize grain parity price</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS / bag</td>
<td>20 % 56,00 53,60 51,00 48,00 46,60 46,00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS / T</td>
<td>1 120,00 1 072,00 1 020,00 960,00 932,00 920,00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NNFC could negotiate selling prices ex-Oshakati at:  
- N$ 48,00 per bag (50 kg) or N$T 960,00 (mark-up of 3%)  
  This can be considered as the bottom line, and cannot provide a bonus for NNFC members.  
- N$ 50,00 per bag (50 kg) or N$T 1 000,00 (mark-up of 7.3%)  
  If the scheme costs are kept within the estimates, members could get a bonus of N$ 2,00 per bag.  
- N$ 55,00 per bag (50 kg) or N$T 1 100,00 (mark-up of 18%)  
  This could cover risks and unforeseen costs associated with a co-op. implementing a scheme for the first time.  

4.3:3. Overall Functions of NNFC Head Office:  

It appeared important for the NNFC Board to clarify the functions of a Head Office. This HO does not physically exist\textsuperscript{31} but it has an existence in the account books, reports, by-laws, etc. NNFC has already decided to open a proper Head Office and is aware of the cost involved not only to set it up but also to run it.  

The limited mark-up possible in grain trading may not economically justify the opening of a Head Office, but by not having one it makes the co-operative marketing of Mahangu difficult if NNFC can secure buying contracts in Oshakati or from Oshakati.  

\textsuperscript{30} Cost estimated at 25 % higher than the transport contract price (N$ 60,00/T) obtained by NDC for the Mahangu purchase drought scheme.  
\textsuperscript{31} Although the NNRDP office in Ongwediva fulfills some functions of a NNFC head office including some communication, secretarial work and logistical (cattle drug scheme) work.
The issue of the NNFC Head Office’s functions and sustainability should be taken on a broader basis and on the longer term. It is crucial for the co-operative to diversify the services to members and Mahangu marketing is exactly about that.

It appeared important for the consultants to summarise the discussion with the NNFC Board about the (present and possible) functions of the Head Office even if it goes beyond its responsibilities in grain marketing.

<table>
<thead>
<tr>
<th>FUNCTIONS</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Administration:</td>
<td>Co-ordination between Branches, information, representation, ...</td>
</tr>
<tr>
<td></td>
<td>Co-op. administration, consolidated co-op. accounts, ...</td>
</tr>
<tr>
<td>2. Livestock Marketing (Meatco):</td>
<td>Co-ordination of auctions, information to Branches</td>
</tr>
<tr>
<td></td>
<td>Education of members</td>
</tr>
<tr>
<td>3. Mahangu marketing:</td>
<td>Negotiating contracts with buyers</td>
</tr>
<tr>
<td></td>
<td>Co-ordination of Branch intake and deliveries</td>
</tr>
<tr>
<td></td>
<td>Central storage and wholesaling, retailing</td>
</tr>
<tr>
<td></td>
<td>Central processing (wholesaling / retailing)</td>
</tr>
<tr>
<td>4. Cattle drugs supply:</td>
<td>Bulk orders and repackaging for Branch shops</td>
</tr>
<tr>
<td></td>
<td>(Facilitating) training in drug handling and management</td>
</tr>
<tr>
<td></td>
<td>Facilitating educational out-reach</td>
</tr>
<tr>
<td>5. Groceries supply:</td>
<td>Negotiating with suppliers, bulk orders for Branch shops</td>
</tr>
<tr>
<td></td>
<td>Training of shop staff in book keeping and management</td>
</tr>
<tr>
<td>6. Agricultural inputs and</td>
<td>Same as 5.</td>
</tr>
<tr>
<td>implements:</td>
<td>seeds, ploughs, cultivators, animal feeds, licks and fodder, ...</td>
</tr>
<tr>
<td>7. Training and community</td>
<td>Education of members on co-operative principles and development</td>
</tr>
<tr>
<td>development:</td>
<td>Training of members (and facilitation): draft animal power, animal</td>
</tr>
<tr>
<td></td>
<td>grading &amp; boreholes (Agrifutura)</td>
</tr>
<tr>
<td></td>
<td>Education of members: veld fire prevention, ...</td>
</tr>
<tr>
<td>8. Market research</td>
<td>Looking for market opportunities for members produce</td>
</tr>
<tr>
<td></td>
<td>Pricing, costing, feasibility, business plans, ...</td>
</tr>
<tr>
<td>9. Other?</td>
<td>Facilitating access of Branches and members to training and loans</td>
</tr>
<tr>
<td></td>
<td>for tractors, threshers, mills and dehullers</td>
</tr>
</tbody>
</table>

4.3.3. NNFC Head Office Location:

The consultants quickly investigated with the NNFC Chairman possible site options for a Head Office. The NNFC Board had resolved that Ongwediva or Oshakati would be the most appropriate locations.

Oshakati is now a fully proclaimed town but all surveyed and serviced land is occupied. At present business stands are not available from the municipality and the only way to get access to one is through a PTO session. Priority is set on surveying and pegging occupied plots, but the Municipality is planning to embark on the servicing of new business stands. It is however unclear when these would be available. The cost of purchasing serviced erven from the Municipality would be around N$ 10,00 per m².
The situation in Ongwediva is different. The Municipality will tender (through MRLGH) this financial year for the servicing of surveyed and pegged erven in the area where NNFC has applied for a 2 000 m² business stand. As the town is not yet fully proclaimed, Ongwediva Council has not been able to decide on the selling prices of erven. Allocated stands are being rented out by the Municipality at N$ 72,00 per month + N$ 18,00 /month for erven above 1 000 m² (+ 10% price escalation per year).

Building a permanent Head Office in a municipal area would be an expensive endeavour, the cost of which, because of limited quantities and small margins, cannot be recovered by Mahangu trading alone. A combination of activities has to be looked at (co-operative business, administration and co-ordination, possibly training, etc.) and their feasibility assessed. In order to give an idea of the investment costs involved, a rough calculation is hereby proposed:

- Purchase of a business stand: N$ 10 x 500 m² = N$ 5 000,00
- Property transfer and service connection costs: N$ 2 000,00
- Construction of a small building (office, storeroom, shop, ...) 45 m²: N$ 54 000,00
- Erection of a small warehouse 55 m²: N$ 44 000,00
- Basic furniture and equipment: N$ 30 000,00

*Total investment costs:* N$ 135 000,00

The purchase of a stand for the NNFC Head Office and the construction of a building is obviously a long term plan. Short term alternatives might only be in renting a building, but very few seem available, or establishing a temporary base at the Rural Development Centre where the occupation of a piece of land can be negotiated (this has been done by the Forestry Directorate and the Clay House Project).

4.4 Grain Processing by NNFC Branches and/or Head Office:

4.4.1 Branch Milling Facilities:

As for milling facilities, which could be envisaged as a new co-operative service activity for NNFC Branches and considered as an additional component of any grain marketing scheme, the competition with the (profit making) private sector needs to be carefully taken into account.

Private service mills are mushrooming in all the 4 O’s regions, particularly in rural centres connected to the electrical grid. None of the rural mills visited by the consultants was running at full capacity.

The existing competition for any Branch project aimed at installing a co-operative service mill is summarised below:

Okahao: 1 service mill to be installed soon (to be confirmed)
ELCIN service mill not working (Hippo hammer mill broken down)
Luganda project mills (Drotsky S1 petrol) all broken down
Onesi: 1 newly installed service mill (Drotsky M16 electric), charge N$ 8,00 / lata

Tsandi: 1 service mill at 5 - 10 km on the road to Uutapi, charge N$ 7,00 / lata
Tsandi (Integrated Area Based Project at Uukwaluudhi) mills not operating (broken down ?)

Ompundja: No service mill, but no electricity.

The NNRDP intends to study the possibility of supporting the installation by NNFC of a service mill at Ongongo Branch (which has no co-operative shop), but the consultants were not provided with any detailed information about this plan.

Service mills in rural areas are fairly new and the milling charge relatively expensive (N$ 0,43 to 0,67 per kg for milling only).

A co-operative service mill could offer to members the possibility of payment in kind with a part of the grain brought for processing. This would regularly provide small quantities of grain to be locally traded by the Branch shop. In addition the grain could be milled and sold as flour the same way.

The Branches of the co-operative would have to make a choice for possible processing equipment between:

  a) a simple hammer mill for processing of wet decorticated grain;
  b) a combined dehuller - hammer mill unit processing dry grain.

**Option a)** It has the advantage of reproducing a milling service pattern spreading in the regions, which seems widely accepted by the rural population. But the NNFC Branches would then not offer a type of service different from the other private mills already operating. The other disadvantage is that it requires a powerful machine driven by a costly engine or electric motor.

**Option b)** It would definitely offer a quasi non-existent service in rural areas combining the mechanised dehulling and milling service. This type of service works well at WAD in Mahanene and is apparently fully accepted by the customers. It is, however, not clear what the clientele would prefer in a situation where a private type a) business competes with a type b) unit, the price factor might be critical. As the dry processing requires a less powerful engine or motor and hammer mill machine than for wet processing of an equivalent output of flour, the purchase price and running costs of the combined unit might be comparable or even less than a larger single hammer mill. If this is confirmed, the service charge for dry dehulling and milling could be cheaper.

Lastly, it is worth mentioning that NNFC sent 4 trainees to the MAWRD Mahangu processing training organised by Agrifutura in Mahanene. The consultants were not impressed by the results of the training as discussed with (two of) the trainees. We have to conclude that this training might not have been very successful for NNFC in imparting technical skills to potential operators and in preparing Branches to elaborate a business plan.
4.4.2. Processing Facilities at NNFC Head Office:

NNFC seems to have decided to establish its Head Office at Ongwediva even if this intention would require some time and financial resources to materialise as presented in 4.3.3.

The possibility of locating a commercial unit elsewhere should not, however, be disregarded by the Co-operative. Oongo Branch presents the advantage of its central location in the NNFC Branch set up (roughly half way between Oshakati-Ompundja and Okahao-Onesi-Tsandi).

But the advantages of establishing a processing unit at NNFC's urban Head Office are multi-fold:

- The production is closer to the main consumer market;
- The access to technical back-up and other services is easier;
- The basic facilities for logistics and marketing are combined with the HO ones;
- The operations are located where the management and leadership are concentrated; and
- The generated surplus of the business can significantly contribute to covering the HO overheads.

Additional strategic considerations need to be taken into account.

Firstly, as a co-operative NNFC shall get its raw material supply mainly from its members and through the Branches. The transport costs from the various Branches might not be the same because of the distance and if members are to get the same producer price in all Branches, NNFC will have to take these differential costs into account.

Secondly, in years of deficit production in the 4 O's, the importation of grain at a competitive price will need to be organised if the commercial milling is to be maintained. Milling of both maize and millet can be envisaged in this situation. The Branch shop facilities for retailing the flour would then become essential to NNFC in order to retain the venture as a co-operative business.

Thirdly, a versatile processing unit combining commercial milling and service milling can be envisaged by NNFC. The competition with the private profit making sector will certainly be critical. Furthermore, NNFC as a co-operative shall assess if it is worthwhile setting up a service unit in a town, such as in Ongwediva, where few members live.

Fourthly, the pricing, technical and product quality issues as presented in Chapter 3 shall be addressed in any business plan of NNFC.

4.5 Summary of NNFC Present Capacity and Recommendations:

If NNFC decides to embark from now on a Mahangu marketing scheme for its members (and potential members), it could only do it on a fairly small scale and at Branch level\textsuperscript{32}. This conclusion is drawn from the following elements:

- The low present demand for Mahangu grain at the minimum price expected by NNFC members;

\textsuperscript{32} We do not imply that NNFC should not do it.
- The risk involved in collating Mahangu from farmer members before securing a contract with a buyer (trader/processor);
- The limited capacity of NNFC as an emerging co-operative (see below);
- The relative inexperience of NNFC in grain marketing;
- The fact that the practical management capacities of NNFC are more developed in the Branches than at the Board level in the absence of a staffed Head Office.

Further options for NNFC’s longer term involvement in Mahangu marketing and processing are discussed in the next chapter.

4.5.1 Low Present Capacities of NNFC as an Emerging Co-operative:

The level of its capitalisation does not allow NNFC to procure much grain at any one time, invest in marketing facilities and assume the risks involved.

The storage facilities at Branch level are very limited or non-existent. NNFC Branches could only use temporary facilities which implies that the grain collected should be sold as soon as possible.

The co-operative business experience of NNFC shop staff and Management Committee members relates to simple, low volume and low turnover transactions.

It is our recommendation that the marketing of Mahangu is only immediately feasible under the following conditions:
- A buying contract (such as for a truck load) is secured with an interested company ready to pay on delivery;
- Grain is collected in bags (from members first) at Branch level for the quantity to be sold;
- Farmers wait to be paid for their grain until the buyer gets the grain, effect its payment and the Branch reconciles the income and expenses of the operation.

4.5.2 General Considerations on the Advantages and Disadvantages of Mahangu Grain Marketing for an Emerging Co-operative such as NNFC:

The advantages for an emerging co-operative are multi-fold:

- A co-operative can exercise its comparative advantage over private traders, that is to easily mobilise strategic market information from the producers (price expectations, quantity and location of available surplus, etc.) and act rapidly when the market conditions are favourable.

- It is an opportunity to diversify the economic base of the co-operative, better employ staff, improve the use of the facilities, etc. It is also important that the co-operative not only develops the supply side (inputs, implements, consumer goods) but also the marketing side that brings back an income to the agricultural producers.

- Crop marketing is an interesting way for the Co-operative Staff, Management Committees and Board of Directors to get business experience and build capacities. It is also important for members to get access to information on market conditions and prices, and to understand the costs involved in marketing.
Some disadvantages and constraints may need to be considered by the Co-operative:

- As the price expectations of the farmers are much higher than what the market can offer, Mahangu marketing might not be the best way to mobilise existing and new members.

- Mahangu marketing is a relatively risky business with market conditions difficult to predict much in advance.

- Grain marketing generally works on low mark-up which may not justify important investments unless the co-operative business can be conducted with large quantities.

It remains to be decided by NNFC if it is worthwhile investing its effort and resources into Mahangu marketing or devoting more attention in the short term to other activities that are already developing: supply of agricultural inputs and implements, of veterinary medicine and animal feeds and licks, and of groceries.

4.5.3 Areas of Needs to Develop NNFC Capacities in the Short Term:

The following recommendations are drawn from direct observation of the NNFC operations made during this consultancy. These recommendations are not particularly original and address needs that are common in new and emerging co-operatives in communal areas of Namibia.

- Final detailed costing and budgeting Mahangu marketing for each Branch involved depending on the volume to be handled;

- Procurement, costing and pricing of empty bags in NNFC shops;

- Management of intake and storage (short term) of bags: weighing, quality control, stacking;

- Administration of intake: recording of bags delivered and dispatched, stock control, payments to farmers;

- Branch bookkeeping and consolidation of NNFC accounts at Head Office level;

- Negotiation skills for contracts with transporters and buyers;

It is our opinion that for NNFC to embark on Mahangu grain marketing soon, some light technical support must be provided to address these needs and assist in the proper implementation of the scheme. This support could be extended from several sources according to their areas of expertise, for instance the NNRDP, the MMIU and the Division of Co-operative Development could provide useful backing.

33 The consultants could not get from NNFC a clear position in this regard.
CONCLUSION: FEASIBILITY OF NNFC's INVOLVEMENT IN MAHANGU MARKETING FOR THE SHORT AND LONG TERM

In the short term, on account of the restricted market demand and the minimum producer price expected by NNFC members, the potential of NNFC in marketing Mahangu as a wholesaler (and as a retailer) is fairly limited. It could still be carried out opportunistically if favourable circumstances arose that would allow the Co-operative to pay producers the farm price they demand and fully recover its marketing costs.

Speculative storage of Mahangu grain for wholesaling or retailing by such a financially fragile emerging co-operative as NNFC is too risky if undertaken beyond very small quantities at Branch shop level or between the Branches.

Service milling at NNFC Branch level is an option worth considering by NNFC for the short and medium term. We recommend that a processing unit combining dehuller and hammermill be given preference as it gives commercial flexibility and advantage over potential competitors. Technical and managerial training would need to be provided; technical back up and management capacity building inputs would be critical at least in the first months of operations. A standard Branch business plan could be elaborated with NNFC if it decides to embark on this development.

A centrally managed co-operative Mahangu marketing scheme, in the absence of Head Office and management staff, could only be entered into through the strong involvement on a voluntary basis of the NNFC Board, which would be constrained by problems of time availability and lack of experience.

The issue of the NNFC Head Office has become a central point of discussion with the co-operative leadership. But Mahangu grain trading alone cannot economically justify the sustainability of such HO. In the longer term, it would be advantageous to locate a central Mahangu commercial processing unit there.

We wish to point out that the NNFC Head Office issue should not only be taken on a functional basis for Mahangu marketing and other co-operative businesses. At the present stage of its history, NNFC needs some strategic planning for the development of its activities from Branches to Head Office. The structure of NNFC should also be given some attention with regard to whether all Branches are to develop with a standard set of common activities centrally controlled by the Board of Directors, or whether Branches should move towards primary co-operative registration with more autonomy in decision making and risk taking while the Head Office and leadership manage a service secondary co-operative.

\(^{34}\) The short term is defined as the current marketing season 1997/98 and the long term for the coming 5 to 10 years.
LIST OF ANNEXES

I. Terms of Reference
II. Acronyms and Abbreviations
III. List of Persons Consulted and Companies Visited
IV. NNFC Membership
V. Government Drought Scheme: Mahangu Purchase by NDC (Nov. 96 - July 97)
VI. Bulk Density of Mahangu Grain
VII. Mahangu Grain Traders and Prices (July - Aug. 1997)
VIII. Service Mills in the 4 O’s (Aug. 1997)
IX. Processing Machine Specifications
X. Addresses of Relevant Manufacturers and Suppliers
XI. List of Relevant Written Materials Consulted
XII. NNFC Shops
XIII. Quotations / Brochures from Suppliers of Processing Equipment
CONSULTANCY ON MAHANGU MARKETING BY THE NORTHERN NAMIBIA FARMERS' CO-OPERATIVE

1. Background

Mahangu is the main staple food of the indigenous people living in the northern communal areas of Namibia. Life of many of these people revolves around the production of mahangu, which entails ploughing, planting, weeding, harvesting, threshing, dehulling, milling and even further processing.

Mahangu is mostly grown for household consumption. In years of bad rain, there is a considerable deficit in production. However in good years, as in 1997, the harvest is greater than many of the larger producer households could consume. As regards the surplus production which is not being stored at the farm level, producers have the predicament of not knowing how to market their surplus production.

2. Objectives

The objective of the consultancy is to examine how individual members of the Northern Namibia Farmers' Co-operative (NNFC) can market and get quickly money for their surplus mahangu.

In addition, the consultancy shall examine the present and potential capacity of the Northern Namibia Farmers' Co-operative Ltd in the mahangu marketing process. The undertaking of such a study is being initiated on the endorsement by the NNFC 2nd Congress on 24 May 1997 that requested the NNFC to explore the possibilities of getting engaged in the marketing of mahangu.

The study shall be conducted on the condition that the NNFC agrees, as outlined by the Honourable Minister of Agriculture, Water and Rural Development, that the price of mahangu shall be based on what the consumer is prepared to pay and therefore be roughly on parity with the price of maize.

3. Method of consultancy

The study shall be conducted in a participatory manner, involving in particular the participation of the leadership of the NNFC as far as possible and as required.

It shall allow for the NNFC Board members to have consultative meetings with their grass-roots members and the views expressed at such meetings be made available to the consultant by the board members.

The consultant shall be required to have briefing meetings with the members of the Board at the start, during and at the end of the assignment.
The consultant is required to familiarize him/herself with the operation of the Mahangu Marketing Intelligence Unit of the Namibian Agronomic Board and be able to have access to any information he may need for the study. He or she should also establish contact with and obtain information from the consultant Grain Storage Facilities in Northern Communal Namibia. Finally, the consultant shall familiarize him/herself with the training programme on mahangu processing which is executed by Agrifutura.

4. Coverage of the study

The study to be undertaken should cover the areas where the Northern Namibia Farmers’ Co-operative Ltd has a concentration of members, which would warrant joint marketing of mahangu, which means mainly Omusati and Oshana regions.

5. Detailed Tasks

The consultant should examine in particular the following:

1. The quantity of marketable mahangu in the 1997 season by members and prospective members;
2. The manner in which individual households react to different price levels in terms of how much they are prepared to sell under different price scenarios;
3. The possible markets for mahangu, within and outside the region;
4. The possible technologies for further processing of mahangu;
5. The present and potential capacity of NNFC and measures to develop this capacity for (including examining the infrastructure, machinery, personnel, working capital):
   a) procurement of mahangu from farmer members;
   b) storing of mahangu;
   c) marketing of mahangu without further processing;
   d) further processing of mahangu;
   e) the cost for NNFC to undertake activities 7(a) to (d).
6. To explore the potential of NNFC in marketing mahangu as a wholesaler and possibly also as a retailer;
7. To explore the potential and capacity of NNFC to market mahangu grain and also mahangu flour;
8. To compile a report on his/her findings and draft a feasibility study concerning NNFC’s activity in mahangu marketing; and indicate which of the newly created (employed) infrastructure would be used every year and which would remain unused in the drier years.
9. Based on the acceptability of the plan by the NNFC leadership then produce a business plan which would allow a credit and be acceptable to Agribank.
Possible additional assignment: If the co-operative wants it the consultant should in addition examine the following issues:

i) retailing of mahangu grain and/or flour beyond their own shops, including the possibility of operating mills outside the region, say Windhoek or Walvis Bay;

ii) processing of flour to higher value products, e.g. cake, bread, baby food and retailing to other customers.
### ACRONYMS and ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AET</td>
<td>Agricultural Extension Technician</td>
</tr>
<tr>
<td>BoD</td>
<td>Board of Directors</td>
</tr>
<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>DCD</td>
<td>Division of Co-operative Development (MAWRD)</td>
</tr>
<tr>
<td>DEES</td>
<td>Directorate of Engineering and Extension Services (MAWRD)</td>
</tr>
<tr>
<td>Exco</td>
<td>Executive Committee</td>
</tr>
<tr>
<td>Enda-Zwe</td>
<td>Environment and Development Activities - Zimbabwe</td>
</tr>
<tr>
<td>4 O's</td>
<td>Omusati - Oshana - Ohangwena - Oshikoto (regions)</td>
</tr>
<tr>
<td>GRN</td>
<td>Government of the Republic of Namibia</td>
</tr>
<tr>
<td>GST</td>
<td>General Sales Tax</td>
</tr>
<tr>
<td>HO</td>
<td>Head Office</td>
</tr>
<tr>
<td>kW</td>
<td>Kilo watt</td>
</tr>
<tr>
<td>LFCU</td>
<td>Likwama Farmers’ Co-operative Union (Caprivi Region)</td>
</tr>
<tr>
<td>MAWRD</td>
<td>Ministry of Agriculture, Water and Rural Development</td>
</tr>
<tr>
<td>MC</td>
<td>Management Committee</td>
</tr>
<tr>
<td>MMIU</td>
<td>Mahangu Marketing Intelligence Unit</td>
</tr>
<tr>
<td>MRLGH</td>
<td>Ministry of Regional, Local Government and Housing</td>
</tr>
<tr>
<td>NAB</td>
<td>Namibian Agronomic Board</td>
</tr>
<tr>
<td>NCAs</td>
<td>Northern Communal Areas</td>
</tr>
<tr>
<td>NDC</td>
<td>Namibia Development Corporation</td>
</tr>
<tr>
<td>NNFC</td>
<td>Northern Namibia Farmers’ Co-operative</td>
</tr>
<tr>
<td>NNRDP</td>
<td>Northern Namibia Rural Development Project</td>
</tr>
<tr>
<td>NRC</td>
<td>Namibia Resource Consultants</td>
</tr>
<tr>
<td>NNRCCI</td>
<td>Northern Namibia Regional Chamber of Commerce and Industry</td>
</tr>
<tr>
<td>OMAFA</td>
<td>Omahangu Farmers’ Association</td>
</tr>
<tr>
<td>RDC</td>
<td>Rural Development Centre (Ongwediva)</td>
</tr>
<tr>
<td>RIIC</td>
<td>Rural Industries Innovation Centre (Kanye, Botswana)</td>
</tr>
<tr>
<td>T</td>
<td>(metric) tonne</td>
</tr>
<tr>
<td>WAD</td>
<td>Women Action in Development</td>
</tr>
</tbody>
</table>
ANNEX III

LIST OF PERSONS CONSULTED AND COMPANIES VISITED

NNFC Board of Directors, Branch Management Committees and Members:
- Okahao, Onesì, Tsandi and Ompundja

Windhoek:
* MAWRD:
  - Co-op. Devt Division:
    . Mr Christof Brock
    . Mr I-Ben Nashandi
    . Mr Jürgen Von Muralt
    . Mrs Lowisa Shiwalo
    . Mr Philemon Katoma
    . Mr Daniel Ndinga
  - Early Warning Unit:
    . Mr Kintinu Sageus
    . Mr Sheuyange Asser
    . Mr M Hishekwa
  - Marketing Division:
    - Agric. Planning Division:
      - Planning Directorate:
        - DEES:
          - NNRDP:
          - SARDEP:
* Namibia Agronomic Board (NAB):
* Agrifutura:
* AGRIBANK:
* Development Fund of Namibia:
* NDC:

* Namibian Grain Distributors:
* African Marketing:
* FeedMaster (Namib Mills):
* Best Buy Supermarket:
* Bonmilk:
* NRC (Namibia Resource Consultants):
* NRI (Natural Resource Institute, UK):
* Pr Peter Pauly

. Mr David Lederle
. Mr Small
. Mr Hannes Esterhuizen
. Mr Widmann
. Mrs Vera Schatz & Mr Karel Noppé
. Mr Andrew Sergeant
. Mr Jonathan Coulter
Oshakati / Ongwediva:
* MAWRD:  - DEES
- NNRDP:

- RDC:
* Mahangu Marketing Intelligence Unit (MMIU):
* NDC:  - Regional Representative:
* AGRIBANK:  - Oshakati Branch Manager:
* Chamber of Commerce and Industry (NNRCCI):  - Mr David Angula
* IMLT:
* Municipality of Ongwediva:  - Town Planner
* Municipality of Oshakati:  - Town Clerk
* Otjiwarango Motors & Tractors:  . Mr Gert Bomhhardt (repairs & field service)
* Advanced Refrigeration:
* Electro Mech
* Independence Caterers:
* Oshana Caterers:
* Eluwa Wholesales and Mills
* Kanjengo Mills
* Uugwanga Oshini Mills
* Check Ndeya No2 Mills

Ondangwa:
* Ministry of Trade and Industry:
* Namib Mills:
* Mr Kilian Amuporo
* Nakathilo Mahangu Crushers:
* Oshinanena Wholesales

Mahanene:
- MAWRD Research Station:  . Mr Wolfgang Lechner
- Seed Growers' Co-op. (NNFSGC):  . Mr Simon Shileka
- WAD:  . Mrs Else Lechner

Oniipa / Onandjokwe:  - ELCIN Mill

Otjiwarango:
- Hoffmann Farm Implements:  . Mr David Shilongo
- Otjiwarango Tractors & Motors:  . Mr Ernie Kopp
. Mr Joseph Sheya

Otavi:
- Namib Mills:  . Mr Peter Göttert

Grootfontein:
- Rovic:  . Mr Keith Wright
. Mr Montgomery

Okahandja:
- Nutrifood:
ANNEX IV

NNFC MEMBERSHIP

I.  Paid-up Membership and Co-operative Share Capital- Aug. 1997:

(As per NNFC Branch records following the May 1997 Congress)

<table>
<thead>
<tr>
<th>Branch</th>
<th>Nb of Mbs</th>
<th>Share value</th>
<th>Total Share Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Okahao Branch</td>
<td>82</td>
<td>N$ 50,00</td>
<td>N$ 4 100,00</td>
</tr>
<tr>
<td>Onesi Branch</td>
<td>44</td>
<td>N$ 50,00</td>
<td>N$ 2 200,00</td>
</tr>
<tr>
<td>Tsandi Branch</td>
<td>53</td>
<td>N$ 50,00</td>
<td>N$ 2 650,00</td>
</tr>
<tr>
<td>Ompundja Branch</td>
<td>104</td>
<td>N$ 50,00</td>
<td>N$ 5 200,00</td>
</tr>
<tr>
<td>Ogongo Branch</td>
<td>19</td>
<td>N$ 50,00</td>
<td>N$ 950,00</td>
</tr>
</tbody>
</table>

Total NNFC : 302

N$ 15 100,00

II. NNFC Membership before 1997 Congress: 371 Members

(Source: Rev. A. Iita)

(Based on annual fee payment)

III. Membership in 1995 at Inception of NNFC:

(Source: Rev. A. Iita)

- Okahao: 20
- Onesi: 15
- Tsandi: 20
- Ompundja: 15

Total: 70
### ANNEX V

**Government Drought Scheme**  
**Total Mahangu Purchase per Regions by NDC Regional Office**  
*(November 96 - July 97)*

<table>
<thead>
<tr>
<th>Region</th>
<th>Quantity purchased in kg</th>
<th>Total in kg</th>
<th>% of total purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Depot deliveries</td>
<td>Collect points</td>
<td></td>
</tr>
<tr>
<td>Oshana</td>
<td>10 669.68</td>
<td>58 969.92</td>
<td>69 639.60</td>
</tr>
<tr>
<td>Omusati</td>
<td>9 978.80</td>
<td>375 066.70</td>
<td>385 045.50</td>
</tr>
<tr>
<td>Oshikoto &amp; Kunene</td>
<td>7 134.00</td>
<td>18 237.90</td>
<td>25 371.90</td>
</tr>
<tr>
<td>Non-identified areas *</td>
<td>2 713.10</td>
<td></td>
<td>2 713.10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30 495.58</strong></td>
<td><strong>452 274.52</strong></td>
<td><strong>482 770.10</strong></td>
</tr>
</tbody>
</table>

* When the area of origin could not be clearly located in a specific region.

---

**Mahangu Purchase By NDC Regional Office From Oshana and Omusati Regions**  
*(November 96 - July 97)*

<table>
<thead>
<tr>
<th>Constituency</th>
<th>Quantity purchased in kg</th>
<th>Total in kg</th>
<th>% of total purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Depot deliveries</td>
<td>Collect points</td>
<td></td>
</tr>
<tr>
<td>Ompundja</td>
<td>2 129.00</td>
<td>58 969.92</td>
<td>61 098.92</td>
</tr>
<tr>
<td>Oshakati</td>
<td>7 144.60</td>
<td></td>
<td>7 144.60</td>
</tr>
<tr>
<td>Okatana</td>
<td>140.00</td>
<td></td>
<td>140.00</td>
</tr>
<tr>
<td>Okaku</td>
<td>1 256.10</td>
<td></td>
<td>1 256.10</td>
</tr>
<tr>
<td>Onesi</td>
<td></td>
<td>217 450.30</td>
<td>217 450.30</td>
</tr>
<tr>
<td>Tsandi</td>
<td>9547.90</td>
<td>34 905.50</td>
<td>44 453.40</td>
</tr>
<tr>
<td>Anamulenge</td>
<td>430.90</td>
<td></td>
<td>430.90</td>
</tr>
<tr>
<td>Uutapi</td>
<td></td>
<td>122 710.90</td>
<td>122 710.90</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>20 648.50</strong></td>
<td><strong>434 036.62</strong></td>
<td><strong>454 685.12</strong></td>
</tr>
</tbody>
</table>

Source: NDC Oshakati Regional Office records. Tables compiled by Selma El Obeid.
## PHYSICAL CHARACTERISTICS OF MAHANGU BULK DENSITY OF MAHANGU GRAIN

*Source: D.A.V. DENDY, NRI 1993*

<table>
<thead>
<tr>
<th></th>
<th>Okashana grain</th>
<th>Large grain (local variety)</th>
<th>Small grain (local variety)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulk density (ml / kg)</td>
<td>1.250</td>
<td>1.225</td>
<td>1.333</td>
</tr>
<tr>
<td>Thousand grain weight (g)</td>
<td>11.2 ± 0.5</td>
<td>9.4 ± 0.5</td>
<td>4.5 ± 0.5</td>
</tr>
<tr>
<td>Kg per 20 litres (lata)</td>
<td>16.0</td>
<td>16.33</td>
<td>15.0</td>
</tr>
<tr>
<td>Number of latas in 1 tonne</td>
<td>62.5</td>
<td>61.2</td>
<td>66.7</td>
</tr>
</tbody>
</table>
### Mahangu grain traders and prices (July-August 97)

<table>
<thead>
<tr>
<th>LOCALITY</th>
<th>ENTERPRISE</th>
<th>TRADING UNIT</th>
<th>BUYING PRICE (N$/lata)</th>
<th>SELLING PRICE (N$)</th>
<th>QUANTITY BOUGHT 97</th>
<th>GRAINS ORIGIN</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Per lata</td>
<td>Per kg</td>
<td>Per ton</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oshakati</td>
<td>Eluwa</td>
<td>Sac(50 kg)</td>
<td>7</td>
<td>1.4</td>
<td>1400</td>
<td>200-400 tons (July)</td>
<td>Angola, 4 O's &amp; Okavango</td>
</tr>
<tr>
<td></td>
<td>Uuwanga Oshini</td>
<td>Lata (15 kg)</td>
<td>25</td>
<td>1.7</td>
<td>1700</td>
<td></td>
<td>Barter at supermarket</td>
</tr>
<tr>
<td></td>
<td>Omatala open market</td>
<td>Tin (0.4 kg)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Currently no mahangu grains are sold in the open market.</td>
</tr>
<tr>
<td></td>
<td>NDC, Government Drought Relief Scheme</td>
<td>Sac(50 kg)</td>
<td>21 (1400 N$/ton)</td>
<td></td>
<td>483 tons</td>
<td>Omasati, Oshikoto, Oshama, &amp; Ohangwena</td>
<td>Drought relief programme Nov 96-July 97</td>
</tr>
<tr>
<td>Ondangwa</td>
<td>Kilian Amuporo</td>
<td>Lata (15 kg)</td>
<td>15 (1000 N$/ton)</td>
<td>25</td>
<td>1.7</td>
<td>1700</td>
<td>Small &lt;1 ton (July)</td>
</tr>
<tr>
<td></td>
<td>supermarket</td>
<td>Sac (65 kg)</td>
<td>Own farm production</td>
<td>30</td>
<td>2</td>
<td>2000</td>
<td>Small &lt;1 ton (July)</td>
</tr>
<tr>
<td></td>
<td>Oshinanena wholesale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Regional Location</td>
<td>Enterprise Name of Owner</td>
<td>Install Date</td>
<td>Trading Unit</td>
<td>Service charge (N$) Per Lata</td>
<td>Per Kg</td>
<td>Model of Machine</td>
<td>Comments</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------</td>
<td>--------------</td>
<td>--------------</td>
<td>------------------------------</td>
<td>--------</td>
<td>-----------------</td>
<td>----------</td>
</tr>
<tr>
<td><strong>URBAN CENTRES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Oshakati:</td>
<td>Uugwanga Oshini</td>
<td>2/97 &amp; 7/97</td>
<td>Lata</td>
<td>10</td>
<td>0,67</td>
<td>2 x Drosky M16 22 kW elect.</td>
<td>2 Hmills in new building; Older Hmill just repaired (bearings) Milling/day = 30-40 lataS</td>
</tr>
<tr>
<td></td>
<td>Check N'deya No 2 (J. Paulus)</td>
<td>6/97</td>
<td>Lata</td>
<td>10</td>
<td>0,67</td>
<td>Drosky M16 15 kW elect.</td>
<td>Open bldg at back of shop Milling/day = 6-7 lataS</td>
</tr>
<tr>
<td>* Ongwediva:</td>
<td>Kajengo Mills</td>
<td>10/96</td>
<td>Lata</td>
<td>12</td>
<td>0,80</td>
<td>Drosky PC24 22 kW elect.</td>
<td>Bldg in garage premises Milling/day = 15-25 lataS</td>
</tr>
<tr>
<td>* Ondangwa:</td>
<td>(Kilian Ampulo)</td>
<td>96</td>
<td>Lata</td>
<td>12</td>
<td>0,80</td>
<td>Drosky M16 15 kW elect.</td>
<td>1 Hmill in new building Milling/day = 15-25 lataS</td>
</tr>
<tr>
<td></td>
<td>(Tobias Mujele)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RURAL AREAS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Omusati:</td>
<td>Women Action for Development (WAD)</td>
<td>95 ? Kg</td>
<td>Kg</td>
<td>0,25</td>
<td>0,25</td>
<td>RIIC Hmill Kokuyo dehuller</td>
<td>Combined service dehulling &amp; milling Each machine on 5.5 kW elect. motor Capacity/hour = 50 kg (?)</td>
</tr>
<tr>
<td>- Mahanene</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Okahao</td>
<td>ELCIN Parish</td>
<td>95</td>
<td>Lata</td>
<td>6</td>
<td>0,40</td>
<td>Hippo Hmill (RSA) elect. ? kW</td>
<td>Broke down recently (hammers to be changed and loose belts)</td>
</tr>
<tr>
<td></td>
<td>Luganda project</td>
<td>92-93 ?</td>
<td></td>
<td></td>
<td></td>
<td>Drosky S1 petrol</td>
<td>All broken down (4)</td>
</tr>
<tr>
<td>* Tsandi</td>
<td>(Male Iyenda)</td>
<td>7/97</td>
<td></td>
<td></td>
<td></td>
<td>Drosky M16, 15 kW elect.*</td>
<td></td>
</tr>
<tr>
<td>* Onesi</td>
<td>(Mr Kapangeru)</td>
<td>7/97</td>
<td>Lata</td>
<td>9</td>
<td>0,60</td>
<td>Drosky M16 15 kW elect.</td>
<td>Very few customers but very recent</td>
</tr>
<tr>
<td>* Oshikuku</td>
<td>Omuramba</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Uitapi</td>
<td>(Johnny Kambwea) of Bush Master Oshakati</td>
<td>97 (7)</td>
<td></td>
<td></td>
<td></td>
<td>Drosky M16, 15 kW elect.*</td>
<td></td>
</tr>
<tr>
<td>* Onanda</td>
<td>(Friedrich Tsitenda) Oshipangwa</td>
<td>7/97</td>
<td></td>
<td></td>
<td></td>
<td>Drosky M16, 15 kW elect.*</td>
<td></td>
</tr>
<tr>
<td>* Ongwena:</td>
<td>Onkwaya west</td>
<td>?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Feasibility by NNRDP (Onamutanda)</td>
</tr>
<tr>
<td>- Onkwebe</td>
<td>Omungwelmume</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Endola</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Eenhana</td>
<td>(Mr Haimbill)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Oshikoto:</td>
<td>Oshindjokwe</td>
<td>3/96</td>
<td>Lata</td>
<td>6.5</td>
<td>0,43</td>
<td>Drosky M16 15 kW elect.</td>
<td>Self designed elect. grain cleaner Higher charge when grain cleaned Milling/day = 30-40 lataS</td>
</tr>
<tr>
<td>- Onayena</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Oshana:</td>
<td>None identified</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional Location</td>
<td>Enterprise (Name of Owner)</td>
<td>Install. Date</td>
<td>Trading Unit</td>
<td>Service charge (N$)</td>
<td>Model of Machine</td>
<td>Comments</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------</td>
<td>---------------</td>
<td>--------------</td>
<td>---------------------</td>
<td>------------------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>* Not located:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- M. Haindongo</td>
<td></td>
<td>12/94</td>
<td></td>
<td></td>
<td>Drotsky M16, 15 kW elect.*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Oshakati)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- N. Tuhaferi</td>
<td></td>
<td>5/95</td>
<td></td>
<td></td>
<td>Drotsky M16, 15 kW elect.*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Ondangwa)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- N. Hafeni</td>
<td></td>
<td>8/95</td>
<td></td>
<td></td>
<td>Drotsky M16, 15 kW elect.*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Oshakati)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Suncity</td>
<td></td>
<td>5/96</td>
<td></td>
<td></td>
<td>Drotsky M16, 15 kW elect.*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Oshakati)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- L. Hasholo</td>
<td></td>
<td>5/97</td>
<td></td>
<td></td>
<td>Drotsky M16, 15 kW elect.*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Tel. 06751-61241)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Andreas Kapasheva</td>
<td></td>
<td>5/97</td>
<td></td>
<td></td>
<td>Drotsky M16, 15 kW elect.*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Oshakati)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Aurs Motors Spares</td>
<td></td>
<td>7/97</td>
<td></td>
<td></td>
<td>Drotsky M16, 15 kW elect.*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Ondangwa)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Agripa Shilongo</td>
<td></td>
<td>7/97</td>
<td></td>
<td></td>
<td>Drotsky M16, 22 kW elect.* x 3 Hmills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Oshakati)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Note: as per invoice book of Ojwarango Motors & Tractors (the date then refers to the purchase date)

This table is not an exhaustive list of service mills in the 4 O's
<table>
<thead>
<tr>
<th>Type of machine</th>
<th>Manufacturer</th>
<th>Distributor / Agent</th>
<th>Specifications</th>
<th>Capacity (Manufacturer)</th>
<th>Capacity (Actual)</th>
<th>Where installed?</th>
<th>How many?</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hippo Hammer Mill</td>
<td>Precision Grinders</td>
<td>Enda Zve</td>
<td>4 000 rpm, cyclone</td>
<td>550 - 725 kg/h</td>
<td>180 - 240 kg/h*</td>
<td>LFCU (Katima), Jan. 94</td>
<td>1</td>
<td>* capacity for service milling</td>
</tr>
<tr>
<td>18.5 kW motor for both</td>
<td>(Harare, Zimbabwe)</td>
<td>(Harare, Zimbabwe)</td>
<td></td>
<td></td>
<td></td>
<td>Katemo (Rundu), 93</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>18.5 kW motor for both</td>
<td>De Freitas</td>
<td>Enda Zve</td>
<td>1 700 rpm, cyclone</td>
<td>18 kg batch (5 mm)</td>
<td>100 - 150 kg/h*</td>
<td>LFCU (Katima), Jan. 94</td>
<td>1</td>
<td>* capacity for service dehulling</td>
</tr>
<tr>
<td>Hippo Hammer Mill</td>
<td>Precision Grinders</td>
<td>None in Namibia</td>
<td>Model 100: no cyclone</td>
<td>270 - 540 kg/h</td>
<td></td>
<td></td>
<td></td>
<td>Pupkewitz (Whk) started selling</td>
</tr>
<tr>
<td>5.5 kW or 8.5 kW diesel</td>
<td>(Harare, Zimbabwe)</td>
<td>(MMIU)</td>
<td>Model 200: cyclone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tan-Tan Hammer Mill</td>
<td>Tanroy Engineering</td>
<td>None in Namibia</td>
<td>?, cyclone</td>
<td>270 - 550 kg/h</td>
<td></td>
<td></td>
<td></td>
<td>Similar to Hippo 1, but with cyclone</td>
</tr>
<tr>
<td>Tan-Tan 38 elect. 15 kW</td>
<td>(Harare, Zimbabwe)</td>
<td>(MMIU)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tan-Tan Dehuller</td>
<td>Tanroy Engineering</td>
<td>None in Namibia</td>
<td>cyclone</td>
<td>18 kg batch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>batchflow, 7.5 kW elect.</td>
<td>(Harare, Zimbabwe)</td>
<td>(MMIU)</td>
<td>16 stones</td>
<td>225 - 270 kg/h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RIIC Dehuller</td>
<td>RIIC</td>
<td>None in Namibia</td>
<td>2 000 rpm, favcy/cyclone</td>
<td>25 kg batch</td>
<td>100 - 120 kg/h</td>
<td>Musesse</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>5.5 kW (380 V) elect.</td>
<td>(Kanye, Botswana)</td>
<td>(Kanye, Botswana)</td>
<td>carbonlanum stones</td>
<td>&lt; 400 kg/h</td>
<td></td>
<td>Mahanene</td>
<td>1</td>
<td>Disused</td>
</tr>
<tr>
<td>Rhino Hammer Mill</td>
<td>RIIC</td>
<td>None in Namibia</td>
<td>200 kg/h</td>
<td>&gt; 50 kg/h* (?)</td>
<td>Mahanene</td>
<td>1</td>
<td>* service milling</td>
<td></td>
</tr>
<tr>
<td>elect./diesel</td>
<td>(Kanye, Botswana)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kokuyo Dehuller</td>
<td>As-Af Corporation</td>
<td>Itochu Corporation</td>
<td>continuous flow, fan</td>
<td>500 kg/h</td>
<td>&gt; 50 kg/h* (?)</td>
<td>Mahanene, 1993?</td>
<td>1</td>
<td>Out of 20 granted to MAWRD 1992</td>
</tr>
<tr>
<td>model E (5 HP)</td>
<td>(Tokyo, Japan)</td>
<td>(Joburg)</td>
<td>(modified rice polisher)</td>
<td>750 rpm</td>
<td></td>
<td></td>
<td></td>
<td>(3 diesel at DEES whhouse</td>
</tr>
<tr>
<td>( Elect. motor 380 V</td>
<td>Hitachi (Japan)</td>
<td>Fuji Heavy Ind. (Japan)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>in Ongwediva)</td>
</tr>
<tr>
<td>( Robin 7.5 HP diesel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* service dehulling</td>
</tr>
<tr>
<td>(model DY35B, 348 cc)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rovic Hammer Mill</td>
<td>Rovic</td>
<td>Rovic</td>
<td>30 kg/h</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robin 5.5 HP petrol engine</td>
<td>(Grootfontein)</td>
<td>(Grootfontein)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hippo Hammer Mill (RSA)</td>
<td>A. Collins /</td>
<td>Pupkewitz</td>
<td>12 hammers, 4500 rpm</td>
<td>100 kg/h</td>
<td></td>
<td></td>
<td></td>
<td>Sieve of 1.2 mm supplied</td>
</tr>
<tr>
<td>* Baby Hippo</td>
<td>Yamaha (Durban)</td>
<td>(Windhoek)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>for the past 6 years</td>
</tr>
<tr>
<td>Yamaha petrol engine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| (5.5 HP, model MZ175) | | | | | | | | *
<p>| * No 1 | | | | | | | | |
| Yamaha petrol engine | | | | | | | | |
| (10 HP) | | | | | | | | Not in stock |</p>
<table>
<thead>
<tr>
<th>Machinery Type</th>
<th>Make</th>
<th>Model/Location</th>
<th>Type/Other Details</th>
<th>Capacity</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hammer Mill S1</td>
<td>Drotsky</td>
<td>Otjiwarongo Motors &amp; Tractors</td>
<td>4 hammers, diam. 300 mm</td>
<td>100 kg/h</td>
<td>++</td>
</tr>
<tr>
<td>Hammer Mill S4</td>
<td>Drotsky</td>
<td>Otjiwarongo M&amp;T</td>
<td>4 hammers, diam. 365 mm</td>
<td>200 kg/h</td>
<td>+</td>
</tr>
<tr>
<td>Hammer Mill M16</td>
<td>Drotsky</td>
<td>Otjiwarongo M&amp;T</td>
<td>4 hammers</td>
<td></td>
<td>++++</td>
</tr>
<tr>
<td>Hammer Mill PC24</td>
<td>Drotsky</td>
<td>Otjiwarongo M&amp;T</td>
<td>6 hammers</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Hammer Mill M36</td>
<td>Drotsky</td>
<td>Otjiwarongo M&amp;T</td>
<td>12 hammers</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Roller Mill</td>
<td>MaxiMill, Maize Master</td>
<td>None in Namibia</td>
<td>&lt; 500 kg/h (maize)</td>
<td>Mahanene, ?</td>
<td>1 Disused</td>
</tr>
</tbody>
</table>

Note: 1 HP = 0.746 kW; 1 kW = 1.34 HP
ANNEX X

ADDRESSES OF RELEVANT MANUFACTURERS AND SUPPLIERS

I. GRAIN BAGS:

- SPILO (NAMIBIA) (PTY) LTD: Textile and Bag Manufacturers
  (Factory: 17 Feld St.), P.O. Box 825 Swakopmund
  Tel. 064 - 46 26 49   Fax: 064 - 46 35 43

- AGRA (CO-OP) LTD: * Windhoek Head Office
  20 Besemer St., Southern Industria, P/Bag 12011 Windhoek
  Tel. 061 - 23 19 31   Fax: 061 - 23 19 29 / 30

- ZIMBABWE GRAIN BAG (Pvt) Ltd:
  11 Dunlop Rd, Donnington
  P.O. Box 8191, Belmont, Bulawayo, Zimbabwe
  Tel. 263 - 9 77574 / 5 / 6   Fax: 263 - 9 76779

II. GRAIN COVER SAILS:

- AGRILINK AFRICA (a Division of Mitchimpex cc):
  Unit No 9, The Firs, 5 Humber St., Woodmead, Sandton
  P.O. Box 629 Rivonia, 22128 South Africa
  Tel. 27 - 11 803 3150   Fax: 27 - 11 803 3192

III. PACKAGING MATERIALS:

- AFRICAN PACKAGING (PTY) LTD: Packaging, Strapping, Labelling
  Tommie Muller St., Northern Industria, Windhoek
  P.O. Box 11035 Klein Windhoek
  Tel. 061 - 26 29 21   Fax: 061 - 26 22 57

- PLASTIC PACKAGING: Plastic bags and containers
  171 Mandume Ndumufayo Av., Southern Industria,
  P.O. Box 98 Windhoek
  Tel. 061 - 23 51 01   Fax: 061 - 22 89 84

- HUNYANI PAPER & PACKAGING Limited: paper sacks division
  Melbourne Rd, P.O. Box ST 540 Southerton, Harare, Zimbabwe
  Tel. 263 - 4 668 331 / 2 / 3   Fax: 263 - 4 660 518

- TREGER PLASTICS (Pvt) Ltd:
  Newport St., P.O. Box 8563 Belmont, Bulawayo, Zimbabwe
  Tel. 263 - 9 68248   Fax: 263 - 9 79496
IV. PROCESSING EQUIPMENT:

- ROVIC NAMIBIA: Manufacturers of threshers and hammer mills
  Huilbos Street, Industrial Area / Wright petrol station, Okavango Rd
  P.O. Box 527 Grootfontein
  Tel. 067 - 24 3177 / 8  Fax: 067 - 24 3174

- OTIWARANGO MOTORS & TRACTORS: * Distributor of Drotsky hammer mills
  Bahnhof St., P.O. Box 28 Otjiwarango
  Tel. 0651 - 30 3041  Fax: 0651 - 30 2782
  * Installation, repairs & field service:
  Oshakati, Cell. 081 - 129 5208

- ADVANCED Refrigeration & Electrical Services: H. mill electric installation and repairs
  Main Rd, P.O. Box 1239 Oshakati
  Tel. 06751 - 20749 / 21643  Fax: 06751 - 20749

- HOFFMANN'S FARM IMPLEMENTS: Distributor of Drotsky hammer mills
  Hage Geingob St., P.O. Box 60 Otjiwarango
  Tel. 0651 - 30 2738  Fax: 0651 - 30 2498

- DROTSKY AKTIEF (Edms) Bpk: Manufacturers of hammer mills
  P.O. Box 352, Alberton 1450, Johannesburg, South Africa
  Tel. 27 - 11 864 1640/1/2  Fax: 27 - 11 908 2056

- RIIC (Rural Industries Innovation Centre): Manufacturers of threshers, dehullers, h. mills
  P/Bag 11 Kanye, Botswana
  Tel. 267 - 340 392/3 - 340 448/9  Fax: 267 - 340 642

- TANROY ENGINEERING (Pvt) Ltd: Manufacturers of h. mills, dehullers, winnowers
  179 Loreley Crescent, Off Mutare Rd, Msasa
  P.O. Box AY382, Amby, Harare, Zimbabwe
  Tel. 263 - 4 487 791/3  Fax: 263 - 4 487 794

- PRECISION GRINDERS ENGINEERS: Manufacturers of h. mills, winnowers
  55 Craster Rd, Southerton, P.O. Box 1790 Harare, Zimbabwe
  Tel. 263 - 4 665 631/5  Fax: 263 - 4 668 628

- MAXIMILL: Roller mills
  Riverdale, P.O. Box 322, Kroonstad 9500, South Africa
  Tel. 27 - 562 33 294 / 23 080 (p.m.)  Fax: 27 - 562 33 294
  Cell. 082 771 3397
- KONGSKILDE SA (Pty) Ltd: Grain handling equipment
  194 Main Rd, Anderbolt, Boksburg North
  P.O. Box 6146 Dunswart 1508, South Africa
  Tel. 27 - 11 894 2341 /5   Fax: 27 - 11 894 6194

- As - Af Corporation Ltd: Kokuyo dehuller (rice whitener)
  4 - 14 Midori, 4 - Chome, Sumida-ku, Tokyo, Japan
  Tel. 81 - 3 3634 6381   Fax: 81 - 3 3634 6385
  Telex: 02622570 ASAFCO J
LIST OF RELEVANT WRITTEN MATERIALS CONSULTED


- DENDY David, "Report on a visit to Namibia to assist in the improvement of pearl millet processing and products at the NDC, Musese, Kavango", NRI, 1993


- KEYLER Stefan, "Economics of the Namibian Millet Subsector", Michigan State University, 1996


- LOW Allan & FUSILLIER Christian, "Final Assessment of the Northern Namibia Rural Development Project", Draft, July 1997

- MASDAR ZAMBIA Ltd, "Northern Regions Study", Northern Regions Development Programme (NRDP), Interim Report, MAWRD / ADF, Sept. 1993 & Draft Final Report, Nov. 1993


- MAWRD, "Food security or food self-sufficiency for Namibia? The background and a review of the economic policy implications", Discussion Paper No 1, Division of Agricultural Planning, Directorate of Planning, Windhoek, June 1997
- MMIU/NAB, "Grading - Mahangu", Windhoek, Namibia Agronomic Board, 1997

- MMIU/NAB: Minutes of the Mahangu Marketing Intelligence Unit Steering Committee Meetings, 1996-97


- Namibia Early Warning & Food Information System, "Crop Assessment Report" (and other printed data and tables), Early Warning & Food Information Unit, Windhoek, MAWRD, 1997

- NNFC, "By-Laws of the Northern Namibia Farmers’ Co-operative (NNFC) LTD as adopted on the 18 May 1996", Oshakati, June 1996


- NNRDP, "Refresher Course on Book Keeping and Accounting in NNFC Branches", Document for the training workshop in Okahao, 8/07/97, MAWRD/NNRDP


- NNRDP, "Monitoring of the Co-operative Shops: Okahao - Ompundja - Onesi - Tsandi", Reports on the visits by the NNRDP, NNFC, 1996/97


NNFC Shops (report as per consultants visit from 28/07 to 01/08/97).

NNFC is running four shops which are selling basic consumer goods as well as some agricultural inputs.

These shops are located at Ompundja, Okahao, Tsandi and Onesí. 3 shops benefit of NNRDP support (seed capital, training and follow up).

<table>
<thead>
<tr>
<th>Locality</th>
<th>General Characteristics</th>
<th>Stock on sale</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ompundja</strong></td>
<td>Property of branch, Dimension: 56 m², Building in bricks with cemented floor. Site: good Adequate security (burglar bars). No Electricity</td>
<td>Groceries and cattle salt licks. Eluwa maize meal (NS$): *p. price *s. price 10 kg 17 21.85 50 kg 65 80</td>
<td>Shop built by members' physical and financial contribution. An additional office and watch man room (3 x 7 m). 1 lady shopkeeper.</td>
</tr>
<tr>
<td><strong>Okahao</strong></td>
<td>Rented, Dimension: 45 m², Building in bricks with cemented floor. Veranda. site: good Adequate security. Electricity: yes</td>
<td>Groceries, cattle salt licks, animal feeds and cultivators.</td>
<td>Shop reopened recently following a 6 months closure. 1 lady shopkeeper.</td>
</tr>
<tr>
<td><strong>Tsandi</strong></td>
<td>Rented, dimensions: 25 m² Corrugated iron building with cemented floor. Site: unfavourable Inadequate security. Electricity: yes</td>
<td>Cattle salt licks only.</td>
<td>No support from NNRDP. Very limited stock. 1 lady shopkeeper</td>
</tr>
<tr>
<td><strong>Onesi</strong></td>
<td>Rented at 190 NS$/month, Dimension: 70 m², Corrugated iron building with cemented floor. Site: unfavourable Inadequate security. Poor ventilation. Electricity: yes</td>
<td>Groceries and cattle salt licks. &quot;Cuca shop&quot; type.</td>
<td>3 shopkeepers.</td>
</tr>
</tbody>
</table>
QUOTATIONS / BROCHURES
FROM SUPPLIERS OF PROCESSING EQUIPMENT

1. Otjiwarango Motors & Tractors: range of Drotsky hammermills (2 pages)
2. ROVIC hammermill (1 page)
3. TANROY Engineering (Zimbabwe): hammermill and dehuller (2 pages)
4. RIIC (Botswana): hammermill and dehuller (3 pages)
5. MAXIMILL (RSA): roller mill (2 pages)
6. KOKUYO (Japan): adapted rice polisher for millet dehulling (2 pages)
1997/08/14

SOUTHERN AFRICA DEVELOPMENT & CONSULTING
P O BOX 23778
WINDHOEK

ATTENTION: MR M MALLET

QUOTATION: HAMMERMILLS

1 X NEW S1 ELECTRIC HAMMERMILL, 220 VOLT METER: N$ 4 487-97
1 X NEW S1 PETROL HAMMERMILL, 5,5 HP: (Robin) N$ 5 107-88
1 X NEW S4 ELECTRIC HAMMERMILL, 380 VOLT METER: N$ 6 019-04
1 X NEW S4 PETROL HAMMERMILL, 9 HP: (Robin) N$ 7 600-00
1 X NEW S4 DIESEL HAMMERMILL, 5,5 HP: N$ 11 688-32

S1 SCREENS, ALL SIZES:
HAMMERS, SET OF 4: N$ 98-00 EACH
N$ 132-00

S4 SCREENS, ALL SIZES:
HAMMERS, SET OF 4: N$ 110-00 EACH
N$ 140-00

A
1 X NEW M18 ELECTRIC HAMMERMILL, 15 KW: N$ 16 000-00
1 X NEW M18C THREE POINT HAMMERMILL: N$ 9 800-00

M18 SCREENS, ALL SIZES [0,8 / 1,2 / 1,6MM]: N$ 280-00 EACH
V-BELT, SET OF 8: N$ 695-00
HAMMERS, SET OF 4: N$ 45-00

1 X NEW PC 24 ELECTRIC HAMMERMILL, 37 KW: N$ 21 800-00
1 X NEW PC 24 THREE POINT HAMMERMILL: N$ 12 470-00
PC 24 SCREENS, ALL SIZES [0,8 / 1,2 / 1,6MM]: N$ 330-00 EACH
V-BELTS, SET OF 6:  
HAMMERS, SET OF 4:  

N$  695-00  
N$  45-00  

1 X NEW M36 ELECTRIC HAMMERMILL, 45KW  
1 X NEW M36 THREE POINT HAMMERMILL:  
M36 SCREENS, ALL SIZES [0.8 / 1.2 / 1.6MM]:  
V-BELTS, SET OF 6:  
HAMMERS, SET OF 12:  

N$  27 900-00  
N$  18 936-00  
N$  430-00 EACH  
N$  695-00  
N$  140-00  

PRICES ARE FREE ON RAIL TO OSHAKATI. *  
GST INCLUDED  
PRICES VALID 30 DAYS ONLY.  

REGARDING YOUR ENQUIRY ABOUT DEHULLERS AND THRESBERS, THE FOLLOWING INFORMATION:  

DEHULLERS: WE ARE IN THE PROCESS OF NEGOTIATING IN THIS REGARD. AT THE MOMENT NOTHING IS FINALISED YET AND THUS NOT AVAILABLE.  

THRESBERS: NOT AVAILABLE  

THANK YOU FOR YOUR ENQUIRY. WE HOPE YOU FIND THIS QUOTE IN ORDER. PLEASE DO NOT HESITATE TO CONTACT US SHOULD YOU NEED MORE INFORMATION.  

REGARDS  

[Signature]

63
MAHANGU HAMMERMILL

*12 MONTH GUARANTEE ON HAMMERS
*ROBUST
*Available in PETROL, DIESEL and ELECTRICITY
*CAPACITY 30KG/HOUR
*ECONOMICAL
*EASY TO OPERATE
*SIZE 12 x 0.95 x 0.85m
*MASS 75kg
*Engine interchangeable with THRESHER
*HAMMERS STAINLESS STEEL
*DIFFERENT SIZE SIEVES AVAILABLE (0.8mm 1in.)

NS 6000.00 (635 1mL)

WITH Robin petrol engine 5.5 HP
1 NS 3000.00 for diesel engine
- 08/97 -

IMPORTERS AND DISTRIBUTORS OF AGRICULTURAL MACHINERY AND VALMET TRACTORS
INVOERDERS EN VERSPREIDERS VAN LANDBOUOMASJINERIE EN VALMET TREKKERS
18 August 1997

P.O. Box 23778
Windhoek
Namibia

ATTENTION: MR MICHAEL MALLET

Dear Sir

We thank you for your fax dated 6th August 1997 and we apologise for the delay in responding to your inquiry.

Herewith is our current export prices for our products. Catalogues and details of the products will be sent to you by mail.

15 kW

1) Tan-Tan 38 Hammermill with 20Hp Kirloskar water cooled engine
   US$5 300.00
2) Tan-Tan 38 Hammermill with 20Hp electric motor
   US$3 465.00
3) Tan-Tan 10Hp electric dehuller 1.5 kW
   US$2 255.00
4) Tan-Tan Oil press machine [manual]
   US$ 220.00
5) Tan-Tan Peanut butter mill [electric]
   US$1 020.00
6) Whinower [manual]
   US$ 240.00
7) Multi crop thresher with 5Hp petrol engine
   US$1 800.00
8) Multi crop thresher electric
   US$ 810.00

NB: The prices are F.O.B. Harare.

We hope you will find the prices to be acceptable.

Yours sincerely
TANROY Engineering

Managing Director.

DIRECTORS: M. GWIRIZF (MANAGING), D. ASHLEY, O. HALL, M. C. MHERF, T. MURVEKERI
Attention: Mr T.K. Shatona

Name of Client: Mr Japhet Ismael

Address: c/o Mahangu Market Intelligence Unit
P O Box 2561
Oshakati
Namibia

Tel/Fax: [06751] 20857

PRO-FORMA INVOICE

<table>
<thead>
<tr>
<th>QTY</th>
<th>MACHINE DESCRIPTION</th>
<th>UNIT COST US$</th>
<th>FREIGHT US$</th>
<th>TOTAL COST US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tan Tan mill with 20Hp kirloskar: water-cooled engine</td>
<td>5 300.00</td>
<td>2 300.00</td>
<td>7 600.00</td>
</tr>
<tr>
<td>1</td>
<td>Tan Tan mill with 20Hp hartz engine: air-cooled</td>
<td>6 790.00</td>
<td>2 300.00</td>
<td>9 090.00</td>
</tr>
<tr>
<td>1</td>
<td>Tan Tan mill with 27Hp Andoria engine</td>
<td>5 300.00</td>
<td>2 300.00</td>
<td>7 600.00</td>
</tr>
<tr>
<td>1</td>
<td>Tan Tan mill with 20Hp TS2 Lister air-cooled engine</td>
<td>7 790.00</td>
<td>2 300.00</td>
<td>10 090.00</td>
</tr>
</tbody>
</table>

PRICE:- F.O.B. OSHAKATI

DELIVERY:- Within 60 days from date of receipt of order and deposit payment.

PAYMENT:- By irrevocable confirmation letter of credit negotiable through our Banker - Standard Chartered Bank, Speke Avenue Branch, Harare or by Bank draft 25% with order and balance upon receipt of goods.

NB. Freight charges are for road freighting goods to Oshakati the amounts could be cheaper if rail transport is used.
<table>
<thead>
<tr>
<th>S/N</th>
<th>DESCRIPTION</th>
<th>SPECIFICATION</th>
<th>QUANTITY</th>
<th>UNIT PRICE</th>
<th>TOTAL VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Denuiler</td>
<td></td>
<td>1</td>
<td>P6 490.00</td>
<td>P6 490.00</td>
</tr>
<tr>
<td>2.</td>
<td>Hammermill</td>
<td></td>
<td>1</td>
<td>P5 135.00</td>
<td>P5 135.00</td>
</tr>
<tr>
<td>3.</td>
<td>Ancillaries</td>
<td>Diesel Engine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Training</td>
<td>one person per week</td>
<td></td>
<td>P31 980.00</td>
<td>P31 980.00</td>
</tr>
<tr>
<td>5.</td>
<td>Installation</td>
<td>For outside customers this is high because of Lodging</td>
<td></td>
<td>P 750.00</td>
<td>P 750.00</td>
</tr>
<tr>
<td>6.</td>
<td>Transport</td>
<td>P2,40 per kilometre from Kanye and back</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Installation Date:** N/A  
**Price Basis:** NET  
**Payment:** CASH, BANK DRAFT IN ADVANCE  
**Validity Period:** 30-06-97  
**Warranty Period:** N/A  
**Delivery Method:** CLIENT COLLECTION  
**Prepared By:** ELI KEALOTSWE  
**Designation:** SENIOR MARKETING OFFICER
- Can process up to 600kgs. of grain per hour. Suitable for batch or continuous operation.
- Dry abrasive stones ensure effective separating of waste from finished product.
- Adjustable fan speed and air vents allow precise control of bran extraction.
- Easy lay-out of in-put and out-put controls permit fast, efficient operation.
- Although designed for sorghum de-hulling, the machine can be adjusted for maize or millet.
TECHNICAL DATA

Power requirement: 5.5 k.w. 3 Phase electric motor or a 10 h.p. engine
Main shaft r.p.m.: Approx. 2000
Fan shaft r.p.m.: Approx. 2000
Throughput speed: 10kgs. per minute
Bran extraction: 12 to 15% (adjustable)
Approx. net weight: 200kgs.
Hopper capacity: 25kgs. of grain
Barrel capacity: 20kgs. of grain
Fan capacity: Max. velocity 2000m/min.
Grinding stones: Carborandum vitrified bonded wheels

INSTALLATION AND MAINTENANCE

- Units are supplied ready to install
- Only basic skills required for installation
- Requires only 1 square metre of floor space
- Monthly lubrication of only two bearings
- Replacement of grinding stones and rubber lining after milling 1000 tons is recommended
**MAXIMILL**

Convertible maize to high quality special sifted mealie meal and double your money

**Technical Specifications**

- **Capacity:** Mills up to 500 kg of maize per hour.
- **Quality:** End product complies with Maizeboard specifications for Special Sifted Mealie meal.
  - All hard Grains, such as sorghum (mabele), wheat and millet (mahangu) can be milled.
- **Compact:** Height 2,300 m, Length 1,85 m, Width 0,800 m.
  - Easy to install and maintain.
  - Can be transported by LDV and operated in a car port.
- **Sharpening:** Sharpened Maximill Rollers available on an exchange basis.
- **Other Features:** All main drives by gears and v/belts.
  - Light weight, durable, four screened sieve.
  - Operated by two unskilled labourers.
- **Power Source:** One 7,5 kw 380 volt motor and one 5,5 kw 380 volt motor.
  - Machine can be adapted from electricity to a tractor with PTO or a 10 kw diesel engine.
- **Damping Auger:** Simple but efficient damping process ensures highest quality mealie meal.
  - Driven by a 1,1 kw 380 volt motor.
  - Cost: Mill R 3,400.00 + Vat $$_{17}$$
  - Damping Auger R 3,600.00 + Vat
  - Less than 5% of the cost of a conventional roller mill. (optional)
- **Highly profitable:** After 10 years as registered millers and manufacturers we are highly recommended in the Industry.

---

**Maximill**

Riverdale
P.O. Box 328
KROONSTAD 9500
South Africa

Chris Derksen
Willem Costzes
Petrus Sithole

Tel: 0562-33294
Tel: 0562-23066
Tel: 0562-33260 A/h
Fax: 0562-33294

Int: 27 662 33294

Cell: 034 778 3397

---

No Vat on Exports
CONE TYPE RICE POLISHER
utilized ABRASIVE STONE ROLLER

SCREEN ABRASIVE RUBBER
NET ROLLER RESISTING PLATE
(MAIN SPARE PARTS)

<table>
<thead>
<tr>
<th>Type</th>
<th>Motor Hp</th>
<th>Cap/h</th>
<th>Width</th>
<th>Length</th>
<th>Height</th>
<th>weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>50</td>
<td>5 Ton</td>
<td>720</td>
<td>1,500</td>
<td>1,800</td>
<td>700KG</td>
</tr>
<tr>
<td>B</td>
<td>40</td>
<td>4</td>
<td>700</td>
<td>1,400</td>
<td>1,800</td>
<td>500</td>
</tr>
<tr>
<td>A</td>
<td>30</td>
<td>3</td>
<td>650</td>
<td>1,300</td>
<td>1,700</td>
<td>350</td>
</tr>
<tr>
<td>D</td>
<td>20</td>
<td>2</td>
<td>550</td>
<td>1,000</td>
<td>1,550</td>
<td>250</td>
</tr>
<tr>
<td>S</td>
<td>10</td>
<td>1</td>
<td>500</td>
<td>1,000</td>
<td>1,500</td>
<td>130</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>500K</td>
<td>400</td>
<td>900</td>
<td>1,040</td>
<td>90</td>
</tr>
</tbody>
</table>

MERIT OF KOKUYO POLISHER
To get good yield and prevent breakage of tropical rice should be used Abrasive Cone type and utilized the Blower to send cool Jet-air continuously into Polishing Chamber to avoid heatness.

FIGURE OF CONSTRUCTION

KOKUYO RICE MACHINERY.
ABRASIVE STONE TYPE. MILLET (POLISHER) DEHULLER

MODEL: E

SIZE
1 : 2240 mm  or  1840 mm
2 : 800    or  400
3 : 640
4 : 800
5 : 450
6 : 950
7 : 800
8 : 850
9 : 430