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SORGHUM AND MILLET CONSUMPTION PRACTICES IN THE LIMPOPO PROVINCE

A feedback to the stakeholders

Fieldwork report



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RESUME

In 2002, studies were conducted to understand the consumption patterns of indigenous cereals in the Limpopo Province. Fieldwork was implemented in July 2003 in order to present findings of this consumption study to different stakeholders involved in the sorghum sector in the Limpopo Province.

People met were not surprised by the results of the study.

Some people, especially from the Limpopo Province Department of Agriculture, are convinced that sorghum (or millet) is more adapted than maize to the environment of the Limpopo Province. They regret that most investments for agronomical research were dedicated to maize, which has become now more attractive for local farmers. Seed breeders are also interested in consumers' perceptions, which should be taken into consideration more for seeds selection. In fact, criteria of selection focus more on agronomical criteria (drought resistance, yield, ..).

Farmers were not surprised by the information disseminated. They agreed with the urban consumers' perception towards sorghum. Some consider that access to urban markets could be a good opportunity to motivate farmers to produce. However, reaching urban markets seems premature at this stage, as most farmers are only involved in subsistence farming. Their production excess is limited and can moreover be sold locally at a very good price. The harvest in 2003 was extremely bad because of drought. In some instances the researchers could not insist on the potential represented by urban demand when people didn't manage to harvest enough for subsistence.

Presenting a feedback of millet and sorghum consumption practices in town gave the researchers an opportunity to speak about these cereals with local stakeholders. In some parts of Limpopo Province, people don't rely on the conventional food supply chain for their staple food but on a local food system developed around sorghum (and millet) production. People report that farming, storage and processing of sorghum are practised in a "traditional" way which differs from the "industrial" one. They assume the porridge made out of the sorghum meal produced locally is different from the commercial one.

The specificity of local sorghum meal as well as the contribution of this local food chain to the social, cultural, economic development of rural communities should be investigated.

I- BACKGROUND

In 2002, sorghum and millet consumption in the Limpopo Province was studied. The objective was to describe and understand the consumption of traditional cereals in order to know if traditional cereal-based products could offer an opportunity for small-scale farmers to reach the market and especially urban markets. Quantitative surveys were conducted in rural and urban areas [1], and a qualitative survey was performed in urban Polokwane [2]. Consumption practices, perception and demand for traditional cereals were described and analysed as well as the perception urban consumers had of small farmers.

Briefly it appeared that:

I-1 Sorghum-based products could be an opportunity for small-scale farmers to reach urban markets.

- Urban people are still consuming sorghum mainly as a soft porridge for breakfast (the whole family) but also as thick porridge (dinner at home, lunch (ZCC)), as “ting” (ceremonies), as beer (older people, men).
- Sorghum has a very good image among urban people, it is considered as healthy food (nutritious and good for health), and positively as a "traditional, African food" (amongst middle age people).
- Urban people would buy the products of small-scale farmers ((1) to support them, (2) because they think their products are of better quality (fewer chemical inputs), (3) if prices and quality are acceptable.

I-2 The demand of urban consumers could be better satisfied

The products already marketed do not totally meet the consumers' demand for indigenous cereals-based food. A need for either tradition or modernity can justify their unsatisfied demand:

- **a need for tradition:** some people miss traditional products not available in urban markets like whole sorghum seeds, traditional maheu and millet; some look for sorghum-based flours with characteristics similar to those of the past: (1) a wider range of flour in terms of texture from a grade 1 (very fine), to a grade four (coarse), (2) a wider range of ground sorghum in terms of colour providing flour from brown, red and white sorghum without mixing it as it is done currently, (3) a sorghum flour which allows the porridge to be preserved after cooking and eaten cold like it was possible in the past or (4) sorghum flour with a taste similar to the one they use to eat in the past
- **a need of modernity:** consumers want to continue eating sorghum-based products but look for (1) convenient products, which would be adapted to the urban life style like ready-to-eat sorghum-based breakfast cereal, which could look like weet-bix produced by BOKOMO, bread or biscuits made out of sorghum (2) products attractive to young consumers.

II DISSEMINATION OF INFORMATION REGARDING CONSUMPTION OF SORGHUM (AND MILLET)

II-1 Objectives

It was decided in May 2003 to disseminate the data gathered in 2002 regarding the consumption of sorghum (and millet) to the different stakeholders who could be interested. The objectives were:

- To present the results of the sorghum (and millet) consumption surveys to the stakeholders (small-scale farmers, processors, administration (dept of agriculture), researchers)

- To gather the opinion of the participants regarding these results
- To define possible follow-up of the study

II-2 Approach / method

Appointments were made with different stakeholders in the sorghum sector: (see annex 1 “schedule” and annex 2 “contacts”).

II-2-a : Small-scale farmers of the Limpopo Province:

M. Ramaru (Dept of Agriculture/BASED) and M. Lassalle (GRET/CERC/UNIN) gave the



Photo 1: Meeting at the University of the North with the forum the Limpopo Development Association

researchers the opportunity to present their results during a forum of the Limpopo Development Association. 15 leaders representing small farmers’ groups were attending the forum at the University of the North (see photo 1). Farmers were from Vembe and Capricorn areas (see map p20), which are not the main areas of sorghum and millet production but are however considered by the Department of Agriculture as more suitable to sorghum production than to that of maize.

The other farmers met were all located in the Sekhukhune District (see maps p. 20), which is the major area of sorghum and millet production in the Limpopo Province. Two villages were visited thanks to Africare. The first one (Mamone - see photo front page) had already been visited by

researchers of CIRAD (Sandrine Dury (2002) and Genevieve Fliedel (2000)). In this village a group of farmers is organised in a cooperative. The second village was Marishane.

Other farmers were met in Schoonoord thanks to M. Mike Ramushu from the college of Agriculture of Tompi Seleka. In this last village, the general secretary of Sekhukhune Farmers Union (Union of small-scale farmers of Sekhukhune affiliated to NPAFU - Northern Province African Farmers Union) was met. He spent the whole day with the researchers giving them the opportunity to meet a lady farming sorghum on a very small scale as well as an emerging farmer who also produces sorghum.

Most farmers met are not comfortable with English. The results were presented in Sepedi by Faith Motau (Master Student-U. Pretoria). She used paperboards in villages and a power point presentation during the forum at the University of the North.

II-2-b : Processors:

Different kinds of processors were met:

- The public relation manager of Progress Mill, a big milling company leader in the Limpopo Province. Progress Mill is involved in a community development programme, which tries to mobilise and encourage small-scale farmers in the province.
- Medium-size mill owners or managers: Mpudulle roller Mills located in Sekhukhune, as well as the mill of the Zion Christian Church (ZCC) in Boyne at about 40 km from Polokwane.
- Small hammer mill owners (Skoonoord).

II-2-c : Department of Agriculture

Contacts were established and meetings organised with agents of the Limpopo Province Department of Agriculture at different levels, first in Polokwane (Mr. Ramaru, Mr. Mkari, Mr. Gordon Donaldson) and then mostly with extension officers from different districts (Nebo, Lebowagomo, Schoonoord).

II-2-d : Research

Researchers from different institutes and different fields were met:

- Prof. Willy Wenzel, from the Grain Institute of the Agricultural Research Council (Potchefstroom), a specialist in sorghum seed selection.
- Prof. Kingsley Ayisi, agronomist from the University of the North.
- Prof. John Taylor, from the Department of Food science at the University of Pretoria, specialist in sorghum biochemistry.
- Prof. Hettie Schönfeldt from the University of Pretoria, Centre of Nutrition

II-2-e : Education/training

We met with Mr. Mike Ramushu from the Agricultural College from Tompi Seleka.

Students from the University of the North attended the meeting with farmers.

II-2-f : Development program/NGO

Some people met are involved in development programs or NGOs: Based (Broadening Agricultural Services & Extension Delivery), Africare and CRCE (Centre for Rural Communities Empowerment).

II-2-g : Stakeholders not met:

Some stakeholders involved in the sorghum sector were not met, like

- national sorghum processors (like King Corn), food industries like producers of Baby Food (Nestle), and breakfast cereals (Bokomo),
- seeds companies (Pannar)
- companies providing small mills (Trotsky)
- SAGIS the “South African Grain Information Service”

III SMALL-SCALE PRODUCTION OF SORGHUM IN THE LIMPOPO PROVINCE: LOCAL ORGANISATION FOR A SPECIFIC PRODUCT

Using both published data and information gathered in July 2003 during meetings with different stakeholders of the sorghum sector, the following part presents an overview of small-scale production of indigenous cereals in the Limpopo Province, focusing more on sorghum. It must be kept in mind that the purpose of the fieldwork realised in July 2003 was to give feedback of previous results. Information was gathered during meetings without a specific methodology. It must therefore be considered as hypotheses, which should be verified, or ideas leading to further investigations.

III-1 Limpopo Province : a province of sorghum small-scale producers, mainly located in Sekhukhune

South Africa produces annually between 200 000 and 400 000 tons of sorghum, mainly on commercial farms on a large scale in the Free State and Mpumalanga.

Table 1: Sorghum seasonal table

Period	RSA (t) (d)	FS (t) (d)	MP (t) (d)	NW (t) (d)	LP (t) (d)	KzN (t) (d)	EC (t) (d)	GP (t) (d)	LP/RSA
1995/96	241300	132740	92660	8300	5100		2500		2%
1996/97	445000	219800	151500	40200	27500		1000	5000	6%
1997/98	355000	187000	102700	39300	18900		900	6200	5%
1998/99	264600	140000	70000	33000	17000	200	0	4400	6%
1999/00	155950	83000	40000	19000	3000	200	750	10000	2%
2000/01	352450	214200	70200	33600	24150	400		9900	7%
2001/02	175580	87500	41650	26400	14280			5750	8%
2002/03	197275	100000	57600	13750	18900	125	400	6500	10%
2003/04	196703	115000	53650	11700	11250	303		4800	

Source : SAGIS, www.sagis.co.za

Compared with the Free State, the Limpopo Province, in the Northeastern part of the country, is not an important area for cereal production mainly because of climatic constraints.

Data relative to production could lead to underestimating the importance of sorghum farming in Limpopo Province. A survey published by Statistics South Africa in 2002 [3] describes both large and small-scale agriculture. It shows that 75% of South African “farming operations” involved in sorghum production are located in the Limpopo Province (see table 2).

Table 2: Farming Operations and sorghum production by Provinces

	WC	EC	NC	FS	KN	NW	GP	Mp	LP	RSA										
FO ¹	23	407	12	56	216	51	4	45	278	1093										
FO ¹ Former RSA/ former homeland	23	-	15	392	12	-	40	17	26	189	17	35	4	-	8	37	5	272	150	943
FO ¹ producing sorghum	Former homeland: 33																			
FO ¹ producing sorghum	Former RSA: 2																			
FO ¹ producing sorghum	0*	3	0*	1	3	1	-**	-**	27	35										
Quantity harvested (tonnes)	560	491	-**	552 594	352	218 636	-	-	11 005	783 638										

¹: FO = Farming Operation x 1000

0 = more than nothing but less than 500

- = not applicable

Source : [3]Statistic South Africa

The main difficulties faced by farmers producing cereals in the Limpopo Province are an annual rainfall of less than 600 mm, together with frequent periodic droughts. Water scarcity should push farmers towards growing drought resistant cereals yet maize remains the major cereal produced in the Limpopo Province.

In the less dry parts of Limpopo Province, most farmers produce maize which is considered as an easier crop to produce than sorghum (or millet).

Millet and sorghum are mainly relegated to the driest areas like Sekhukhune District (in the southern part of the province - see map p. 20), unsuitable for maize farming. Mr. Mkhari (Dept of Agriculture – Polokwane) estimates that 80 % of sorghum from Limpopo Province is produced in Sekhukhune district.

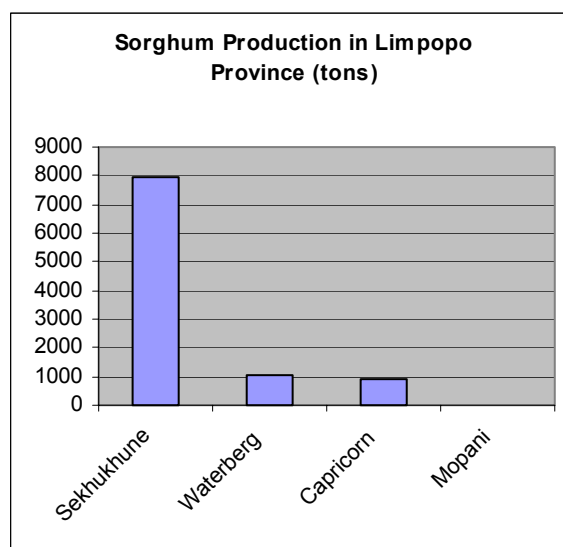


Figure 2 : source Mkhari, J.J.[4]

III-2 The sorghum food chain in Sekhukhune District

III-2-a : Production in a former homeland:

Sekhukhune District is a trans-boundary magisterial district as the southern part of the district is part of Mpumalanga (See map p. 20). According to extension officers of the Department of Agriculture, sorghum in Sekhukhune District is produced in areas which were part of the former Lebowa, the homeland of the Northern Suthus (or Pedi people) during the Apartheid era.

III-2-b : Small-scale and emerging farmers

Sorghum in Sekhukhune is mainly produced by **small-scale farmers** who farm small plots of 1 to 2 ha. These surfaces are considered as problematic as they are too small for commercial farming but too big when farmers are isolated (farming is often the activity of single elderly women) with limited access to mechanisation.

A major constraint according to extension officers is that most small-scale farmers are old, while young people don't seem to be interested in farming activities.

Another important point raised by extension officers is that many small-scale farmers do not really rely on agriculture to survive. A second activity, a pension (old people receive R600 a month) or a remittance can represent the regular revenue of the household and can demote agriculture-generated income to the status of a secondary source of income.

Besides the majority of small-scale farmers, some **emerging farmers** are also involved in sorghum (or millet) production. Farming larger areas, with a better access to mechanization and inputs, emerging farmers are not subsistence farmers, as they commercialize an important part of their production. Emerging farmers seem to play a key role locally because:

- they provide jobs
- they are in possession of tractors small-scale farmers can hire,
- they sell their produce locally.

According to the people met in rural Sekhukhune, many people should be able to farm but do not. They think it is just a question of laziness as well as of a lack of markets: *“There is no problem of land in Sekhukhune, there is plenty of land but the problem is that it has no use to increase the production if there is no market.”* *“Some people don't farm because they are lazy”*.

III-2-c : Farming between tradition and modernity:

An attachment to inherited seed to preserve the taste of porridge:

Some farmers buy sorghum seed to farm. The seeds company quoted by farmers is Pannar. Pannar provides hybrid sorghum seed, which engage farmers in a seed dependency cycle, as they have to purchase new seed every season. Some farmers complain about the price (R200/10 kg) but this commercial seed is esteemed to give better yields, to allow early harvests (10 weeks, 110 days) or to give small sorghum plants, which are more wind-resistant. PANNAR provides training sessions once a year for some farmers of Sekhukhune. People encountered use Pannar 8564 and NK 283.

However, even if farmers can have access to commercial seed, **there is great resistance to using this seed**. The reason given is not the price of the seed but the taste of the porridge made out of this kind of sorghum, which is not appreciated. That's why producers still farm using their own seed. This seems to be a general behavior pattern shared by small-scale as well as emerging farmers: all are attached to their own seed. People usually farm different kinds of seeds, which have local names and are described by farmers according to color and taste criteria: "*The sweetest variety is Sekwibetswana. It is the red variety. But we have another one Masekaswere, the white one, which is not as good as the red one.*" Some sorghum types are farmed because the seeds are available but are not specially appreciated: "*We have 3 kinds of sorghum, Hlakeletale the white and tall one, Moilanong the brownish one and Mantloshe, the pinkish one. The Moilanong we don't like it, it has no taste, we plant it because we have the seeds. It is interesting also because it grows faster, we use it just for poverty alleviation". People never mix the different seeds, nor the different kinds of grains.*

In the opinion of the Department of Agriculture, these small-scale farmers are using sorghum seeds of bad quality leading to low yields, which prevents them from commercialising sorghum. A programme is currently in the process to develop the varieties selected by small-scale farmers themselves. However, most farmers met think the quality of their sorghum seeds is far better than the ones they could buy in the shops because "*they come from our grand-parents*". They don't refer to the agronomical qualities of the seeds but to the tastiness of sorghum porridge they can prepare with their sorghum. Taking into consideration the sensorial quality of the final product will be a condition of success for the seeds selection program.

Researchers and agents of the Department of Agriculture are aware of the importance of the farmers' seeds in terms of **biodiversity**. Indeed a lot of varieties of sorghum can be found locally, which is an advantage for the adaptation to a difficult environment even though it makes commercialisation difficult.

Farming practices:

Farmers in Sekhukhune produce sorghum on dry land in a semi-arid environment. Irrigation, as well as climatic factors, influences the characteristics of the grains. [4]

Some farmers declare farming without any input. "Here farmers don't use fertiliser, they plant organic sorghum". Cow manure seems to be expensive for farmers. Some say that chemicals are used just for hybrid seeds, but not for local varieties.

Hiring tractors to plough seems to be a common practice. It costs R250/ha in Marishane but can be more expensive in Schoonoord. People from the Department of Agriculture think it would be to the advantage of farmers to go back to animal traction to plough their fields, to save money and use manure as fertiliser. However they don't think farmers would accept it, since using animals is now considered as old-fashioned practices.

Farmers provide labour locally to weed sorghum fields and during harvest time. Workers are paid R25 a day. Workers can be other farmers as well as people who don't farm their own land. People remember the "letjema" (group of workers), existing in the past. In the "letjema", groups of people came to work in a field for free but everybody contributed and profited from it.

Very big variations were observed in the yields. People say that on 1ha they can harvest up to 20 bags (of 80/100kg) but if rains are scarce it can decrease to 5 bags. Big variations in production exist at national level as well.

A middle size family uses about 1 bag a month. The harvest in 2002 was bad but the situation is worse in 2003. Small farmers who rely on their sorghum production for household consumption will have to buy cereals from October or November. People remember 1986 as a very good harvest.

III-2-d : A local commercialisation disconnected from official market

In Sekhukhune, in case of excess, subsistence farmers commercialize cereals (sorghum, millet and to a lesser extent maize) locally. Cereals are mainly sold to neighbors who do not farm or do not harvest enough, and sometimes to shop tenants or small millers. In the villages visited, there is no market, customers know who has cereals to sell and go to the farmer's place to buy.

Cereals are always sold as whole grains and not as flour. Most farmers, and even emerging farmers, report that it is not a problem to sell the surplus. However, some consider that a bigger market could motivate people to produce more.

It is surprising to see that farmers who identify different qualities of sorghum in terms of taste don't practice different prices. All types are sold at the same price. In addition farmers report that they don't choose the grains they sell and the ones they keep for household consumption. The customer decides what he wants and takes it if it is available.

Local prices don't follow clearly established rules. When the price of a sorghum bag (80kg) was R160 in Mamone, it was R300 in Marishane (10 km from Mamone), and R400 the following week in Schoonoord. Farmers know about these differences in price: "*in Marishane, the price is even higher, they sell at R300 for 80 kg*" says a farmer in Mamone.

In Mamone, an extension officer says "*Prices are strange because people don't worry about official prices as they are fixed by the grain board, they just decide the price they want and they find enough customers for what they have to sell.*"

Farmers can also sell to big milling companies. The public relations manager of Progress Mill says "*In 2002, small scale farmers provided 5 000 tonnes of sorghum to Progress, for a total of 80 000 tonnes processed. Sorghum comes mainly from other provinces than Limpopo.*" In comparison, "*In 2002, Progress Mill processed about 150 000 tonnes of maize. 40% came from Limpopo Province and 30% came from small-scale farmers.*"

Sorghum farmers met are reluctant to deal with big milling companies and refuse to sell at the market prices which they consider too low. For example, Progress Mill pays only R86 a bag of 80 kg while farmers in Mamone sell it for R160 on the local market in the same period.

Many farmers think big milling companies want to take advantage of them. Some farmers say big milling companies offered to pay about R500 to R600 for 1000 kg, which is confirmed by extension officers. It is locally considered as an unacceptable low price for farmers. Other bad experiences are reported: "*In 1996 OTK (or NTK) from Marble Hall took my harvest but they refused to pay. I had to go to court to have my money back. They think as we are poor they can cheat us. In 2001 Progress wanted to buy 1 tonne for R580. I didn't sell.*"

People locally, as well as extension officers do not know about a possible seasonal variation of prices for sorghum. Milling companies may come when prices are very low, expecting farmers who have no real storage facilities to sell immediately after harvesting. A farmer says market information is available on TV but no information is given on sorghum.

Farmers explain their prices are high because they have a lot of charges (hiring tractor to plough, hiring people for weeding) but also because the quality of their sorghum is higher than the commercial one.

Big millers disagree, saying on the contrary that the grain of small-scale farmers are often of low quality especially because, harvested too early, they contain too much moisture. Moisture is a constraint for millers; it is also a major concern for the quality of the final product as mycotoxins are more likely to occur if grains are not dry enough.

Big milling companies report farmers refused sometimes to sell at the market price but didn't manage to sell their production locally and finally lost everything. A farmer replies that there is no loss in sorghum with good storage.

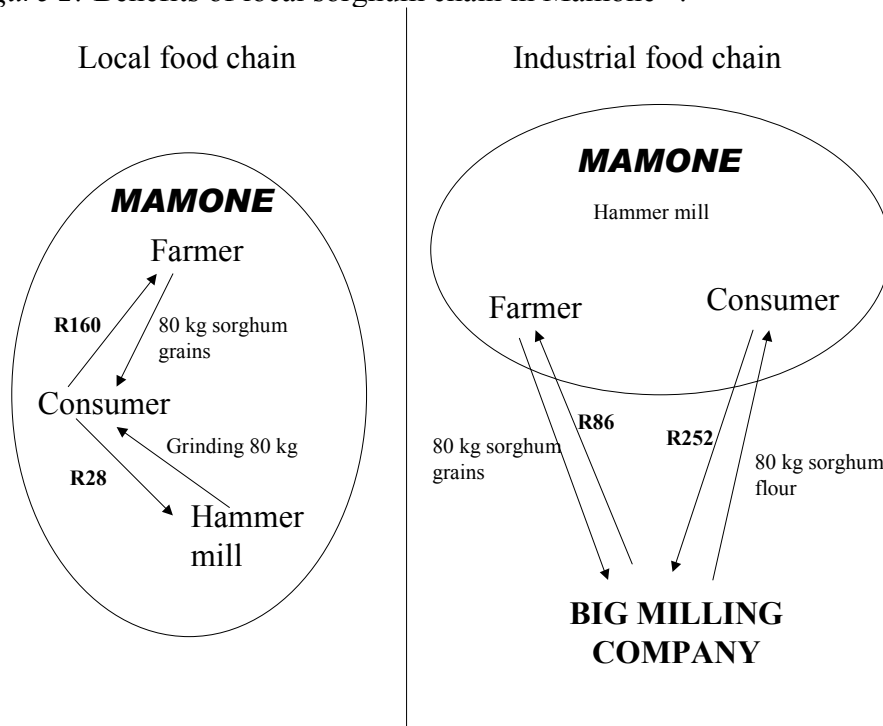
We bring the hypothesis of a shop opening close to the village, selling industrial sorghum flour at market prices (about R250/80kg). Farmers think it wouldn't be a problem and neighbors would carry on buying their sorghum because its quality is better.

Comparing the prices of local sorghum flour with the industrial one, it appears that in Mamone for the consumer local sorghum flour is cheaper than the industrial one in Polokwane. If sorghum is kept locally, consumers buy the grains to local farmers (R160 / 80kg) and pay for grinding to local hammer mills (R28 / 80 kg) which means that consumers pay locally R188 /80kg.

To compare, sorghum flour is sold R252/80 kg at the same period of time in Polokwane. In Mamone, on a financial point of view, local sorghum system is more interesting than industrial processing for both consumers who get flour for a better price and farmers who sell grains at a

better price but also for hammer mills who can carry on their activity. (See figure 2).

Figure 2: Benefits of local sorghum chain in Mamone .



III-2-d : Traditional forms of domestic storage versus integration with the milling industry

Cereal storage must allow farmers to improve household food security, assuring food availability throughout the year; and could increase household incomes by allowing farmers to sell cereals when market prices are high.

In Sekhukhune, an aloe (Aloe Dichotoma), called in sepedi “Letlabela” or “Kgopa” is commonly used to preserve sorghum during storage (See picture 4). The aloe is burnt and ashes are mixed with grains. It is supposed to repel insects during storage. According to Prof. John Taylor (University of Pretoria) the use of aloe



photo 4: Aloe Dichotoma

ashes could increase the pH, which could explain the repellent effect. He suggests that an alkaline effect of aloe ashes could improve the nutritional quality of sorghum. The ashes remain mixed with the grains during the entire storage period. A farmer reports that ashes allow the grains to be stored 2 to 3 years. Just before processing, grains are poured into a bucket, and a part of the ashes blows away but most of it remains mixed with grains during the process (see photo 5). Therefore some ashes are present in the flour and will be consumed in porridge. It can contribute to a change in the taste of the porridge as well as the technical cooking quality of the flour.



photo 5: sorghum mixed with aloe ashes, just before being processed.

Besides the use of aloe ashes to preserve grains, a farmer reports also the use of chemicals (tablets sold at the shop, brand BAYER) during storage.

Specific buildings used to store cereals are not part of the tradition in Sekhukhune. In the past, cereals were stored under the kraal where animals were kept [5]. Today people don't store under the kraal anymore. Usually cereals are kept inside the house (see photo 3). The harvest in 2003 was so small that it did not create big problems but in case of a good harvest, storage could become problematic. A cooperative of farmers met in Mamone is planning to build a storage place for the cooperative.



photo 3: storage of sorghum bags in a room. (Skoonoord)

Progress Mill provides a storage service described by its Public Relation Manager: *“Subsistence farmers don't have storage facilities, because there's no room available in modern houses. Progress offers storage facilities for free. Small-scale farmers can have a contract with Progress Mill. Small-scale farmers can bring their grains to a depot (There are about 100 Progress Milling depots in the Limpopo Province). There, they receive a paper, which indicates the quantity they leave. Then when they need meal they come to collect it at the depot and just pay a grinding fee. If a farmer brings 95kg, he receives 80 kg of sorghum flour and pays R87.93 grinding fee.”* The same person emphasizes the fact that farmers don't pay for storage. Some farmers complain about the fact that they don't withdraw flour coming from the sorghum they gave.

The service provided by Progress Mill is not exactly a storage facility as farmers withdraw flour and not grains. While showing a willingness to help farmers, Progress Mill could be trying to capture the milling market of sorghum kept by smaller mills or still processed at home.

III-2-e : Local processing : towards a whole flour of a single variety of sorghum



photo 6: hammer mill. Skoonoord

The process: Usually sorghum (and millet) is consumed after removing the outer husks and most people prefer to remove the coarser bran layers too [6]. Industrial milling processes remove the germ and bran before processing endosperm into flour. The final product obtained is more digestible and more stable, but a part of the nutrients (proteins, minerals, lipids and vitamins) as well as fibres are lost for human consumption.

In Sekhukhune people are milling the whole grain without removing its outer layer. Sorghum and millet are processed into flour, in the village by small hammer mills (see photo 6), by mobile mills (see photo 7) or by small roller mills located in Sekhukhune area. It is also still ground at home with stone mortars (see photo 8) to avoid paying for milling service, but also because “*the flour ground by hand is more tasty*”.

All these processes mill the whole grain. It is a major difference with industrial refined sorghum meal.



photo 7: mobile mill

Locally people never mix different kinds of grains before processing. Industrial flour, on the contrary, comes from a blend of different kinds of sorghum. It is perceived as a disadvantage by urban consumers [2]. This weakness of industrial sorghum meals is also described by the literature: “*Since the product available in the market is produced from a blend of cultivars, how do we expect a consumer to react to a product with different sensory properties that cooks differently every time?*”[8]



photo 8: Grinding millet with stone mortar

As processes differ, the quality of the flour obtained locally should be different from the quality of industrial flour. The nutritional quality, the sensorial quality, as well as the technical quality (stability and cooking convenience) of both products should be compared.

The cost: When the grains are not ground at home, farmers usually bring buckets of 20 kg to the mill and receive 20 kg of flour. They are charged between R5 to R7 for the service. It is much cheaper than the milling service provided by bigger mills. Progress Mill charges about R87 to deliver 80kg of flour out of 95kg of grains (It is 3 to 4 times more expensive than the local hammer mill). At

Boyne, the mill of the ZCC, they are charged R40 for grinding 80 kg and receive 80kg less 10% for the bran (72kg). (It is 1.5 to 2 times more expensive than the local hammer mill)

There were hammer mills in the visited villages. According to farmers, anybody can start a business with a hammer mill. In Schoonoord, 2 brothers, both of them emerging farmers, own the mills visited. One of them was available for a meeting: He is farming on 27ha. He started his business of milling by buying a hammer mill in 1991 after succeeding in selling tomatoes produced on an irrigated plot. He bought it for R7000 in Alberton (Gauteng) from a company called Trosky. Now he owns 3 mills. The amount he earns with the milling activity is not clearly established as his wife uses it for the household expenditures. He also owns a mobile mill which he bought for R15 000 from Trosky as well. It works with the tractor engine and he charges R6 for 20 kg of grains similar to the hammer mill. The main period of activity for the mill is from June to August just after the harvest. The rest of the year there's not a lot of activity. Mwiinga et al. (2003) [5] describe the same phenomenon in Mozambique and Zambia, "*the hammer mill sector in both countries has substantial capacity, which is likely underutilized during significant portions of each year*". To increase the utilization of hammer mills along the year, the authors suggest that imported maize should be available for small traders and processors.

The same idea could emerge in Sekhukhune. Hammer mills could process more than the scarce local production, if sorghum produced elsewhere could be available. It can be imagined that with sorghum grains bought at official market price, hammer mills would be able to deliver sorghum flour at a very competitive price.

III-2-f : Consumption of millet and sorghum as staple food.

In some parts of rural Sekhukhune, sorghum and millet are the only cereals that farmers can grow. They are staple food for many people.

The importance of sorghum consumption may be amplified by the over-representation of Zionists in the area. The Zion Christian Church, the biggest church in South Africa (11% of the total population are members of the ZCC—census 2001), encourages its members to eat sorghum [2]. The ZCC is over-represented in the Limpopo Province (25%) and even more so in Sekhukhune District (33%).

Even if farmers harvest different varieties of sorghum that they store separately, they don't associate each kind of sorghum with a specific usage: they use it indistinctly.

People met are not surprised by the results regarding the consumption of sorghum in town. During the feedback, people usually agreed with the perception of sorghum as a healthy and nutritious product and they seem to consume sorghum in the same way as urban consumers.

The main difference between urban and rural habits consists in millet consumption in villages. Urban residents do not consume millet because it is not supplied in town.

Farmers in Marishane quoted a recipe of sorghum they cook for newborn babies not reported by urban interviewees: "*My daughter (...) had to leave the baby when he was just one week old (...). We fed the kid with sorghum and he grew very well. Usually we give "Lethasha" to a young baby. You mix water with mabele flour. After a while there are 2 phases in the container, a solid part at the bottom and a liquid part at the top. You take the liquid part and you boil it till you obtain a very soft porridge. This is Lethasha for babies. The solid part you can use to cook porridge for adults. We give Lehtasha to babies from 2 weeks old. It usually complements the milk when mothers breastfeed. It makes babies strong. It is the same grade as Nestum (baby food). To buy Nestum, you have to go to Groblersdal. People usually don't buy Nestum, because it is expensive. It is just the people who can afford it who buy it.*"

Beer is still produced locally with sorghum or millet (see photo 9). Beer is mainly produced just after harvesting. It is a female activity conducted for profit. Beer is sold locally. Women involved in brewing can be farmers or not. If they don't farm, they buy sorghum from local farmers to process the beer. They produce malt from the grains to brew. They add no sugar, no yeast or any other

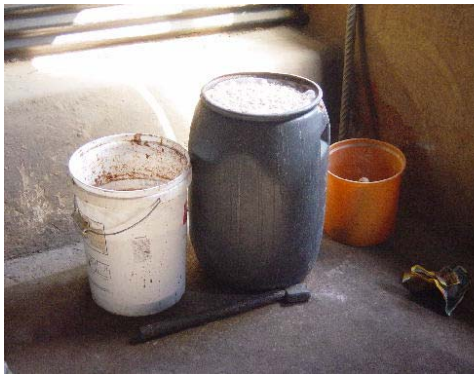


photo 9: Beer brewing in process - Skoonoord

source of starch. It is similar to the traditional Pedi recipe [5] also described by ladies brewing for private purposes in Seshego [2].

Other uses of sorghum

Sorghum is used locally to feed chickens. According to a farmer, it is financially advantageous to use it in this way. “With 100kg of grains you can grow 50 chicken for 6 months and you sell them R25 each. It is profitable, chickens grow well with mabele.”

People report that millet is also often used as chicken feed.

III-2-g : Local sorghum flour /industrial sorghum flour : Recap

The differences between local and industrial sorghum food chain and potential consequences on the quality of final products are presented in figure 3.

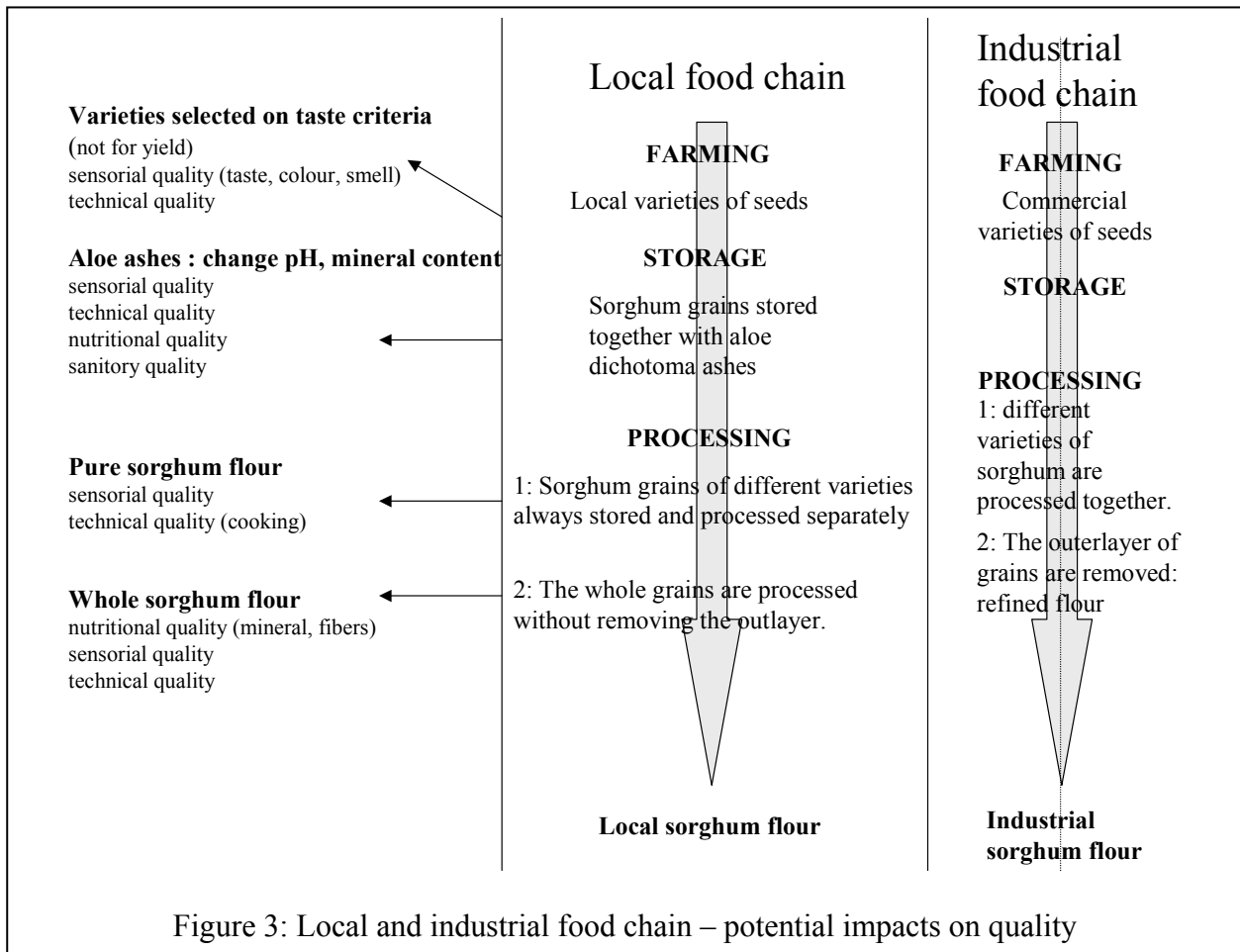


Figure 3: Local and industrial food chain – potential impacts on quality

It is interesting to notice that among urban consumers interviewed in 2002 in Polokwane [2], some compare spontaneously local rural products and the industrial one available in town :

Caroline, 44 years old, remembers what she used to eat as a child in Moletje : “We ate sorghum as soft porridge or as sorghum meal. My grand mother used to grind it between 2 stones (one big and one small). It was very different than what they buy now. It was better. You could eat it even when it was cold. Now you can’t, you have to microwave it. With sorghum today, the problem is the taste. It

doesn't look like what we ate in the past. It is because of the preservative added. Now you can't eat it when it's cold. Another problem is that it isn't pure, a lot of different sorghum are mixed. Before you could make the differences between the different mabele."

Johana is 38, she lives in the village of Mathlala during weekdays where she works as a teacher and in Mangweng (Polokwane) during the week end:

"If you compare the smell of fresh mabelle, the raw one, grinded but not cooked, the smell of commercial one is not nice compared with this one you find in the village."

Thato is 43 years old, she has been living in Mphahlele 16: Female ,

"The taste of industrial product is different from the taste of mabelle from the village. Now in the village there is a machine (mill). I prefer the mabele from the village. The problem with commercial mabele is that you can't keep it: When mabele porridge is cooked, the water is going out. After 2 days in winter you just have to throw it. In the village you could keep it longer. In the past in the village there was mabele in a calabash, and the calabash was left outside so the kids could just help themselves when they were hungry; the product didn't get spoiled.

IV CONCLUSION /PERSPECTIVE

Urban residents of Polokwane are consuming sorghum and would be willing to buy sorghum-based products coming from small-scale farmers from the Limpopo Province.

However, the local production of sorghum results mainly from subsistence farming with little surplus to commercialise. In case of surplus, farmers easily find buyers locally and manage to sell at very high prices.

It is usually advantageous for rural producers to reach urban markets in order to obtain better prices for their products. For small-scale producers of sorghum of Sekhukhune area, commercialising sorghum on urban markets means being in competition with commercial farmers who produce other varieties of sorghum, with more inputs, better access to mechanisation, in a better environment, on a bigger scale. Therefore, competing on official markets at this stage would mean selling at lower prices. Such a perspective could appear worthless for small-scale farmers who are struggling to make a living from agriculture.

However a follow-up of the study should be envisaged. The report shows that a local food chain exists in Sekhukhune, organised for sorghum production. It implies a network of interrelated stakeholders: producers (emerging or small-scale), farm workers, small-scale processors (millers, brewers), customers and consumers.

Moreover, the sorghum meal produced locally could differ from the industrial sorghum meal available on the market. Reasons for this difference could include:

- the use of specific varieties of sorghum,
- the traditional way of storing cereals using aloe ashes which can be found in the final product,
- the processing of the whole grain, which produces a whole grain meal,
- the use of homogenous flour resulting from the processing of one variety of grains

The future of the current sorghum food chain in Sekhukhuneland is uncertain. Chronic droughts, the ageing of farmers, rural depopulation and competition with cheap industrial products could lead to the disappearance of this local organisation. It seems relevant today to understand this local system and debate its interest and sustainability.

Small-scale farmers are encouraged to commercialise their production. As local markets don't exist, the solution for them would be to sell their grains to big milling companies. Currently, farmers are reluctant to adopt this strategy and choose to maintain a local food chain. This can be seen as an alternative to delocalisation and industrialisation of processing and to food standardisation. The benefit of the local food chain should be assessed in the light of

- its economical impact as it maintains local income-generating activities (millers or brewers),
- its social impact as it sustains social relationships between the different stakeholders,
- its cultural impact as it preserves local food habits,
- its impact on the environment as farmers, who are also sorghum consumers, carry on producing with local varieties of seeds.
- the specificity of the final product; nutritional, biochemical, sensorial and technological quality of both local and industrial porridges should be compared.

Once the benefits are assessed, development programs could be proposed to sustain the local sorghum sector valorising its specificities and improving on its drawbacks.

REFERENCES

1. ADAM, H. *Sorghum and millet consumption patterns in the Limpopo Province of South Africa*, . 2002, CSIR: Pretoria.
2. BICHARD, A. *Sorghum and millet consumption patterns in the Limpopo Province of South Africa. Qualitative Survey in Urban Area (Polokwane). Report. CIRAD, University of Pretoria. SCAC-MAE. 58 p.*, . 2002, University of Pretoria/CIRAD: Pretoria. p. 58.
3. LAHOHLA, P., *Report on the survey of large and small scale agriculture. Statistics South Africa*, . 2002, Statistics South Africa: Pretoria. p. 107.
4. TAYLOR, R.N., *Factors affecting the porridge-making quality of South African sorghums*. *J Sci Food Agric*, 1997. 73: p. 464-470.
5. MWIINGA, B.; NIJHOFF, JJ.; TSCHIRLEY, D. & al. *Enabling small-scale maize marketing and processing to assure supplies of low-cost staples*. Policy Synthesis N°66 May 2003 1-7 <http://www.aec.msu.edu/agecon/fs2/psynindx.htm>
6. QUIN, P.J., *Foods and feeding habits of the Pedi*. Witwatersrand University press ed. 1959., Johannesburg. 278 p.
7. DENDY, D., *Drought and urbanization in Africa: The future role of sorghum and millets.*, in *Cereal Science and technology. Impact on a changing Africa.*, P.R. JRN TAYLOR , JH VILJOEN, Editor. 1993: Pretoria. p. 299-317.
8. SOOLIMAN, A.O.G., *Sorghum processing at the cross roads in South Africa*, in *Cereal Science and technology. Impact on a changing Africa.*, P.R. JRN TAYLOR , JH VILJOEN, Editor. 1993: Pretoria. p. 497-507.

ANNEXES

Field work schedule

Tuesday 8th July:	
10h00	Nilton Mudalahothe AFRICARE Groblersdal
Thursday 10th July :	
10h00	M. Joe Ramaru Dpt of Agriculture, Polokwane
17h00	M. Mkari Dpt of Agriculture, Polokwane
Friday 11th July:	
19h00	Mrs Faith Motau Pretoria
Monday 14th July	
14h00	Jonas Upretoria
14h30	Hester Adams U Pretoria
Tuesday 15th July	
12h00	Nilton Mudalahothe, AFRICARE Groblersdal
14h00	M. Ratlou, M. Mahlase Edward, Dpt of Agriculture Nebo
16h00	M. Mashifane Miller Mpudule Roller Mills
Wednesday 16th July	
10h00	Group of Farmers Mamone
13h00	Group of Farmers Marishane
17h30	Nelton Africare Groblersdal
18h30	M. Ramushu Agricultural College Tompi Seleka (Marble Hall)
Monday 21st July	
	M. Masenya Masenya Progress Mill
Tuesday 22nd July	
8h00	M. Masenya Masenya Progress Mill
14h00	University of the North, Forum Farmers Leaders, Extension officers. Mangweng Polokwane
Wednesday 23rd July	
8h00	Willy Wenzel (ARC Potschefstroom). Polokwane
10h00	Samuel (ZCC Mill) Boyne, Moria
11h30	Prof Ayishi (U North) Mangweng Polokwane
14h00	Gordon Donaldson (Agriculture) Polokwane
Friday 25 July	
11h30	Prof. Hettie Schönfeldt (School of Nutrition/ U. Pretoria)
Thursday 31 July	
8h00	William Mashiloane- Tompi Seleka (College of agriculture) Outreach dpt
10h30	Service of agriculture Schoonoord
11h00	General secretary of a Small-Scale Farmers Union M. Bew Ntsebeng Tshehla (Sekhukhune Framers Union) affiliate to NPAFU (Northern Province African Farmers Union). Schoonoord
12h00	Small Mill Josephine Mporo Masha Schoonoord
13h00	Small farmer Mrs Mashego, Schoonoord
15h00	Emerging farmer/small mills M. Thomas Masha, Schoonoord
Friday 1st August	Prof John Taylor Dpt of Food Science U Pretoria

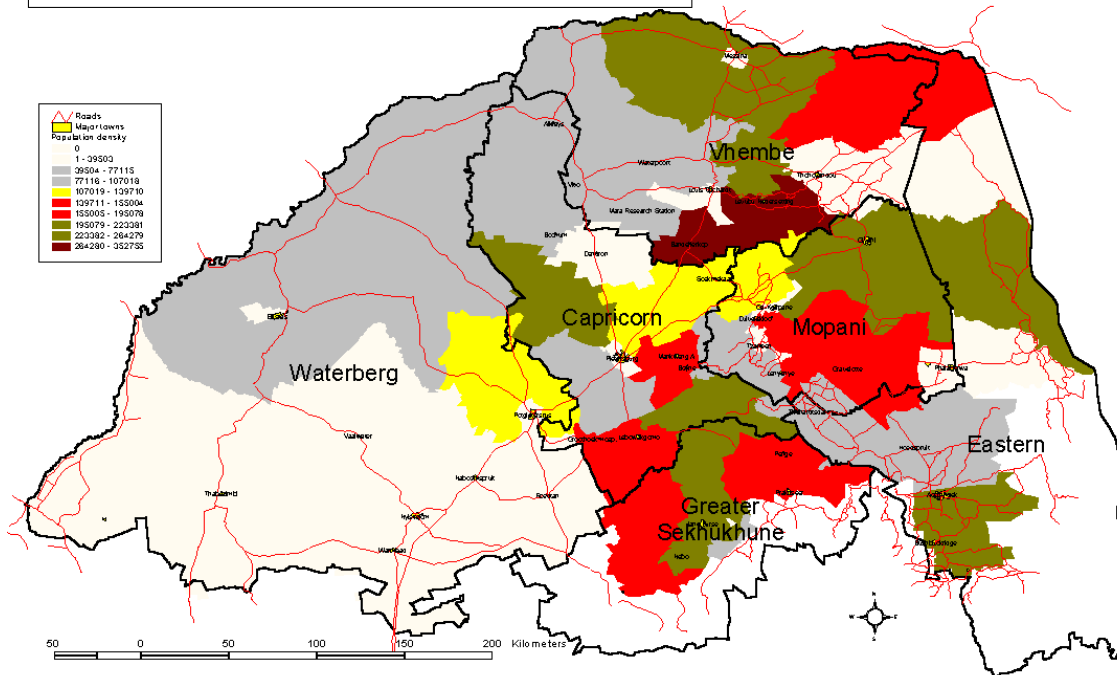
List of Contacts

Name	meeting	Institution	Previous Contact	Phone email
M. Nilton Tzumbedzo Mudalahothe,	08/07	Africare marketing dev. Manager	Tshidi Moroka	013 262 4320/ 3700 072 195 1378 niltonm@hotmail.com
M. Joe Ramaru	10/07	Dpt. Of Agriculture (NPDA) Manager of the project BASED (Broadening Agricultural Services & Extension Delivery)-GTZ	Thierry Lassalle Gret Unorth	015 291 3660 083 255 30 68 ramarujm@agricho.norprov.gov.za
M. Mkhari	10/07	NPDA–BASED	Tshidi + Jo Ramaru	015 295 7090 (ext 302) 015 2911551 082 683 22 07 mkharijjz@agricho.norprov.gov.za
Faith Kholofelo Motau		University of Pretoria Dpt of Consumer Science		072 289 74 78 kholom@hotmail.com
M. Mashifane	15/07	Miller Mpudule Roller Mills	Africare Nilton	082 492 09 94 Groblersdal 0470 PO Box 1705
M. Mahlase Edward And M. Ratlou	15/07	Dpt of agriculture of Nebo	Africare Nilton	073 156 66 75 013 264 0057
M. Phatydi Mphahlele	16/07	Extension officer Mamone, Dpt of agriculture of Nebo	Africare Nilton	082 4377141/
M. Ramushu	16/07	Agricultural College Tompi Seleka (Marble Hall)		013 268 93 00 073 15 666 75 072 29 92 698
M. Masenya	21/07	Progress Mill, Public Relation Manager		tel 015 297 3452 Cel 083 633 7413 masenya@progress-milling.co.za
Dr Willy Wenzel	23/07	(ARC Potchefstroom sorghum seeds breeder	M. Mkhari	018 299 63 60
Gordon Donaldson 014 736 22 50	23/07	Regional Dpt of Agriculture (Station of Towoomba – Warmbath).	M. Mkhari	014 736 22 50 (Towoomba) 015 491 8919 (Potgieter)

Kingsley Ayisi	23/07	(University of the north) implied in sorghum trial with Wellse).	M. Mkhari	082 20059 90
Samuel	23/07	ZCC Mill manager Boyne Moria		015 266 0007
Prof. Hettie Schönfeldt	25/07	School of Nutrition University of Pretoria		Hschon@idpil.agric.za Cel. 083 458 27 57
William Mashiloane	31/07	Tompi Seleka (College of agriculture) Outreach dpt	Mike Ramushu (Tompi College)	082 712 99 77 013 268 93 00
M. Bolale Riba M. Matsomane M. Kgopane	31/07	Service of agriculture Schoonoord	Mike Ramushu (Tompi College)	PoBox 1092 Sekhukhune 1124 Tel 013 2601004 (5)
M. Bew Ntsebeng Tshehla	31/07	General secretary of a Small-Scale Farmers Union (Sekhukhune Framers Union) affiliate to NPAFU (Northern Province African Farmers Union)	Mike Ramushu (Tompi College)	PoBox 1092 Sekhukhune 1124 Tel 013 2601004 (5)
M. Thomas Masha	31/07	Emerging farmer/small mills	M. Bew Ntsebeng Tshehla	083 717 04 94 PoBox 518 Sekhukhune 1124
Prof. John Taylor	01/08	Dpt of Food Science U Pretoria		

Map of Limpopo Province

DISTRICTS OF THE NORTHERN PROVINCE AND THEIR RELATED POPULATION DENSITIES



Map of Sekhukhune District



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