

Département amélioration
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l'innovation scientifique
Cirad-amis

**Mission Report in South Africa
on Sorghum and Millet Consumption Project
in the Northern Province**

August 7 to 27, 2000

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1. Mission objectives

The mission is composed of two main objectives:

1.1. Analysis of the results of the surveys led by the students in the Northern Province

The mission is aimed to discuss the following items:

- Make a synthesis of case studies and literature review undertaken by the students of the University of the North under the direction of the CISR-BIO/CHEMTEK crew.
- Complete, if needed, the works already done by some case studies. Those case studies will go further into the questions put in the first phase or tackle other new questions.
- Organize a meeting of restitution with the stakeholders (producers, processors, shopkeepers, consumers, restaurant owners).
- Prepare the questionnaire for the quantitative study of consumption in urban areas and define the survey programme (surveyed cities, sample size, layers, etc).
- Specify the work programme for the continuation of the project.

1.2. Preparation of a more ambitious development and research project

The second aim of the mission is to prepare the ground for a broader project on the development of agro-alimentary products (millet, sorghum or others) on a large scale (country or region), with a greater number of partners (communities, processors, local NGOs) and development activities.

2. Reminder of the project objectives

The project is composed of two main features:

2.1. Diagnosis of development constraints of millet and sorghum consumption in urban areas

The project aimed to make a diagnosis of the constraints to the development of millet and sorghum consumption in the Northern Province urban areas in South Africa. This diagnosis is made through a consumption study. It will answer two main questions:

- What is the present time importance of millet and sorghum consumption in the urban areas of the Northern Province?
- What are the explanatory factors of the poor consumption of millet and sorghum in the urban areas of the Northern Province?

a) Present time importance of the consumption of millet and sorghum

Evaluate the present time importance of millet and sorghum consumption in the Northern Province, but also the economic weight these products represent in the economy of the area.

b) Explanatory factors of the poor consumption of millet and sorghum

Identify the sources that put a brake on the increase in consumption of millet and sorghum in the towns of the Northern Province, trying to find out if it is due to:

- low availability of the products in time and space

- low diversity of by-products containing millet and sorghum
- low diversity in the recipes made from millet and sorghum
- high prices against the consumers expectations
- inadequate quality to satisfy the consumers' expectations: problems related to the taste, the convenience of use (storage period, painfulness of the proceeding), the uses, the image linked to the products.

The diagnosis concerning the millet and sorghum distribution in town, the marketing of its products between rural and urban areas and the production in rural areas, will be dealt according to the results of the study.

2.2. Installation of an agro-alimentary methodology of diagnosis

Set up an agro-alimentary methodology of diagnosis starting with a consumption study.

This method, enriched by exchange and capitalisation of knowledge between CIRAD-AMIS and CSIR-BIO/CHEMTEK teams, would be at the same time qualitative, quantitative and participative. The project would enable to test the validity of this method (capacity, limit, and difficulties).

3. Persons met

3.1. In Pretoria

a) CSIR, Food Biological and Chemical Technologies Department (Bio/Chemtek)

- *Technology for Development Programme*

- Mrs Tshidi Moroka, Programme Manager, Responsible for the Millet and Sorghum Project ;
- Dr Dave Harcourt, Responsible for the Strengthening African Food Processing Project ¹;
- Ms Busi Dube, Community Trainer ;
- Ms Elaine Jacob, Food Technologist ;
- Ms Nediene Naidoo, Food Technologist ;
- Mr Thabang Jase, Business Management Trainer ;
- Mr David Nchabeleng, Food Technologist ;
- Ms Queen Kgabo, Secretary.

- *Other Programmes*

- Dr Marthinus Horak, Programme manager, Bio-prospecting programme ;
- Dr Terry Watson, Programme manager, Molecular Biotechnology programme.

b) CSIR, Water Environment and Forestry Technology Department (Environmentek)

- Mrs Janice Dewar, Business Development and Integrated Projects.

c) French Embassy

- Mr Pierre Colombier, Counsellor for Science, Culture and Development ;

¹ For further details about this project, you can visit the SAFPP web site (<http://www.safpp.co.za>).

- Mr Jean-Pierre Gay, Co-operation Attaché ;
- Mr Jean-Paul Loyer, Cirad Representative in South Africa.

d) University of Pretoria

- Pr John Taylor, Department of Food Science, University of Pretoria ;
- Dr Sylvain Perret, Associate Professor in Agricultural and Rural Development, Department of Agriculture Economics, University of Pretoria.
- Dr Victor Ndikira, Lecturer, Institute for Technological Innovation, Faculty of Engineering, University of Pretoria
- Mrs Juliana Rwelamira, Associate Director, Post Graduate School of Agriculture and Rural Development.

e) Others

- Mr Douglas Jerome Brown, Agribusiness Advisor, Department of Agriculture, US-AID ;
- Mr Dirk Hanekon, Agricultural Research Council, Institute for Agricultural Engineering (ARC-ILI)

3.2. In the Northern Province

a) University of the North

- Ms Nyakallo Moletsane, Lecturer in Agricultural Economics, Faculty of Agriculture ;
- Mr Naftal Mollel, Associate Dean of the Faculty of Agriculture, Faculty of Agriculture ;
- Messrs Collen Ndlozi, Tebogo Mothwa, Joshua Baloyi, Simon Ntlemo, Nyko Golele and Ms Tebogo Seale, students in Agricultural Economics at the University of the North.

b) Mamone in the Southern district

- The Staung Agricultural Project community group (farmers) ;
- Petrus Mohlala, miller ;

c) Madida (suburb of Potgietersrus) in the Western district

- The Hlahlolalang Community Group (consumers).

d) Progress mills

- Mr Eric Platt, Managing Director of Progress Mills, Pietersburg

4. Mission running

4.1. Partners presentation

a) Technology for Development Programme (CSIR-BIO/CHEMTEK)

Established in 1996, the mission of the Technology for Development Programme is to improve the quality of life of previously disadvantaged communities through the transferral of food processing technologies, within the framework of national priorities policy. The

programme serves the needs of developing communities and small, medium and micro-enterprises (SMME) in food technology, providing them advice and training to improve processing efficiency and quality of products. TFD has established partnerships with national, provincial and local governments, providing communities and SMMEs relevant technology to enhance food security and income generation. The programme has many activities, among which ²:

- Development, implementation and support of food technology based enterprises or projects ;
- Training in food processing of fruit, cereals, legumes and vegetables ;
- Development and implementation of household food security and nutrition programmes and projects ;
- Improvement of the quality, packaging and commercialisation of traditional foods ;
- Technical and business evaluation, monitoring and support for projects and enterprises.

TFD is a 7 years old programme of Bio/chemtek. The programme activities are more oriented in training, monitoring and development than in research. Their expertise is to provide facilities and information between stakeholders (producers, processors, engineers) in food technology transfer. The programme has already worked on sunflower electric press, *acha* kits, 15 small-scale bakeries, mango drying among other projects.

Now they are involved for five years in an USAID project (Strengthening African Food Processing Project) with West African countries. The objective of this 200.000 US\$ project is the development of food processing based enterprises in Africa. One of their first partners

Photo 1 – The TFD team

From left to right: Busi Dube, Dave Harcourt, Nediene Naidoo, Tshidi Moroka, Queen Kgabo, Elaine Jacob and Thabang Jase (missing: David Nchabeleng)



² For further details about the programme, please visit the TFD web site (<http://www.csir.co.za/biochemtek>).

they have visited is ITA (Institut de Technologie Alimentaire) in Senegal. During our stay in Pretoria, SAFPP hold a meeting on the project organization with the USAID representative, Mr Douglas Jerome Brown.

b) Department of Agricultural Economics, Faculty of Agriculture, University of the North

The University of the North was established in 1960, initially under the auspices of the University of South Africa in service of the Sotho, Venda and Xitsonga ethnic groups. Gaining its autonomy in 1969, the University of the North soon became a battleground between political groups during apartheid. Fundamental to the history of the institution was its creation as a political necessity as opposed to an educational necessity. Nowadays, the University is determined to serve its primary function as an educational necessity in the region, willing to be a centre for the promotion of theory and the practice of people centred development. At the moment the university has 8000 students in 8 faculties (Art, Education, Theology, Law, Management, Maths and Natural Sciences, Health and Agriculture).

The Faculty of Agriculture at the University of the North seeks to uplift the historically disadvantage communities and to encourage productive agriculture in the Northern Province by assisting the agricultural development through research into better farming practices and by stimulating outreach programmes that are developed locally for local communities.

The Faculty of Agriculture has 5 departments: Plant Production, Animal Production, Soil Science, Agricultural Extension and Agriculture Economics. Dr Moletsane is one of the 4 lecturers of the Agriculture Economics Department.

During our stay we have met with the Dean of the Faculty of Agriculture, Dr Mollel, who told us about the memorandum between Cirad and the University of the North to provide a financial support and a Cirad researcher working on agricultural extension for one or two years.

4.2. Production, processing and consumption of Sorghum and Millet in the Northern Province

a) Discussions with producers at Mamone village in the Southern District

Sixteen farmers, both men and women compose the Staung Agricultural Project community group. The group has 18 ha of field where they mainly grow sorghum for selling. They produce 254 bags (80 kg per bag). Besides, each of them has his own field of millet or sorghum for their own consumption (about 2 ha) because they like these cereals, even if some families also eat maize. They have got a loan from Africa (NGO). With the selling of sorghum grains they can buy fertilisers, sorghum seeds from a company in Free State (PANNAR Seed (Pty) LTD), tractors and can pay back their loans. They don't sell sorghum to the co-

Photo 2 – Women in Mamone grinding sorghum and millet grains with a stone mill



operatives like for maize but on the local market (100 rands for 50 kg of sorghum and 250 up to 300 rands for 80 kg of millet). In their association, the farmers don't grow the millet because of the difficulties in threshing (for 2 ha, they need 2 weeks to thresh sorghum and 3 for millet). For their own consumption, they grind the whole grain of sorghum and millet into flour by using a stone mill at home or one of the five hammer mill available in the village (5.5 rands for a 20 litres tin). They never dehull the grain like in other African countries (West Africa, Botswana). They both have red and white sorghum, with a floury grain or semi vitreous grain. The red grain has no tannin.

With millet the farmers prepare "pap" (thick porridge) and beer. With sorghum they prepare "bogobe" (thick porridge) and "motogo" (thin porridge). They can also have it boiled. Some of them say that they prefer millet to sorghum, but they all definitely prefer fine flour rather than a coarse. Sorghum and millet are eaten every day for breakfast and dinner (usually they don't have lunch). They prepare porridge with a sauce made of spinach from bean leaves. The same recipes are used in ceremonies (weddings, funerals), but they can also have rice according to their incomes.

To improve their situation, they would like to have:

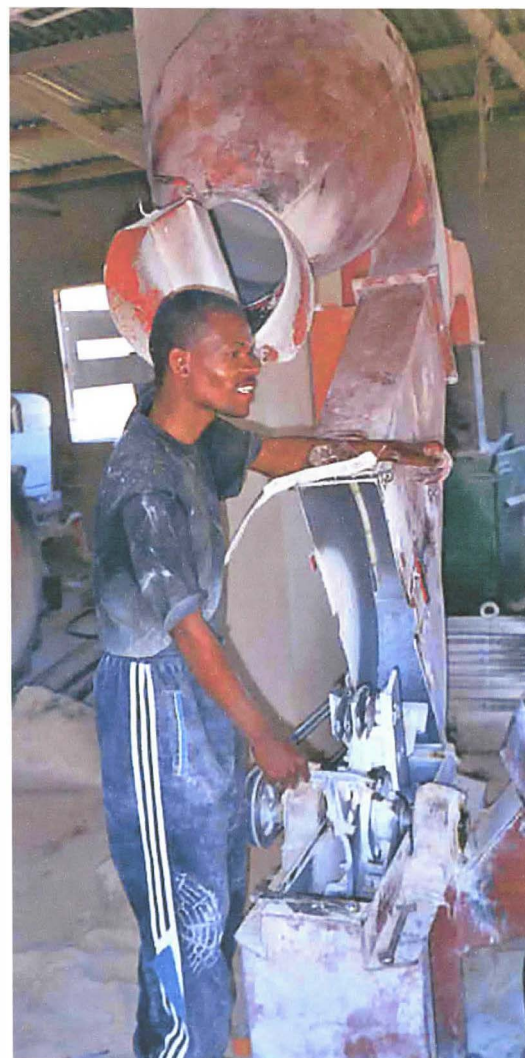
- storage facilities to reduce losses and sell when the prices are higher, as for maize for which producers are organized in co-operatives ;
- threshing machine for millet and sorghum ;
- water irrigation facilities.

b) Discussions with processors

• At Mamone village in the Southern District

There are five hammer mills available for custom milling in this village. We have visited one of them, Motubatse Petrus Mohlala. He grinds the sorghum, millet or maize whole grain into flour without cleaning it, removing stones and without dehulling it before. He is well aware of the importance of this cleaning step because once a month he has to change the hammers often broken by the stones during the milling. He makes himself the hammers from a raw material (a metallic plate) he buys locally. He has different types of sieves he can change in the hammer mill to get coarser or finer flour and even a very large opening size sieve (several mm) to grind stalks for animal feeding. During our visit, three women and one man brought their grains for grinding. It was mainly a mixture of red and white sorghum grain with ashes added for a better storage. Each person brings usually between 10 and 25 kg. The milling of 20 kg grains costs 5 rd and 80 kg costs 22 rd compared to 150 rd for a 80 kg bag of mabele meal bought in a shop. The busiest period for that miller is after the harvest (June, July, and August) where he can process 800 kg per day. Today for instance he was expecting about 50 persons in the afternoon with 20 kg grain each. In slack periods, he practices farming or machinist activities. He should be interested in looking for

Photo 3 – Hammer mill at Momone



some threshing machine made for instance in Botswana (RIIC model) and try to build one on his own in the village.

- *At Process Milling in Pietersburg*

Sorghum is more consumed in the north part of the province. Millet is mainly used for malt. Sorghum has a very good potential in South Africa: ten years ago, only 20.000 tons of grains were processed into “Mabele” meal, about 55.000 to 60.000 nowadays. “Mabele” is mainly consumed by Tswana and Northern Sotho communities. In South Africa, sorghum annual production ranges from 200.000 to 400.000 tons, among them 250.000 tons are used for human consumption: 55.000 are commercialised as “Mabele” meal, 85.000 as “commercial beer”, 40.000 as industrial beer and 20.000 as other products (extruded foods, baby food, breakfast). A part of it (about 20.000 tons) is exported to Botswana.

Progress Milling Company employs 250 persons working 24 h per day. The company mainly processes maize (130.000 tons per year) into maize meal; it also processes sorghum (10.000 tons per year into “Mabele” meal and 10.000 tons per year into “commercial malt”). Progress Milling Company has just started with industrial malt, expecting 10.000 tons for the next year. The company buys 98% of the sorghum outside of the province (Kwazulu-Natal and Mpumalanga) and 80% of the maize (North West Province). The maize grain they have from the co-operatives is already mechanically threshed and cleaned. Progress Milling Company doesn’t buy sorghum from the local farmers because the production is too low and no co-operatives exist to collect, clean and store the grain, which causes logistical problems.

“Mabele” meal is made in two steps: they first remove the bran and a part of the germ, and then, they mill the grain with a roller-mill. The dehulling yield ranges from 85 to 90%. The waste is for animal feed market, which gives a low price. They also make “commercial malt”, i.e. in open area, and they want to start with an “industrial malt” (controlled process of malting).

Progress Milling Company is also involved in a community development programme named “Progress Milling Community Development Programme”, which is mainly aimed to improve production practices of small-scale farmers in the Northern Province (see appendix page 86). The programme assists those farmers by providing them extension support, input supplies, infrastructure transport, training, etc. It focuses on maize for the moment.

- *At Mabele Meal near from Solomondale (next to Bosbult Roller Mills)*

This company mills the sorghum grain into flour named « mabele meal ». At the moment about 25 tons of mabele meal are produced per month: more precisely 16 tons last May, 23 tons in June and 20.7 tons in July. The company mainly buys red sorghum grain from Free State and Mpumalanga Province but no grain are provided by farmers in the Northern Province because the production is too low and the supply not constant in quantity and in quality. The processing flow is the following: the grain is first cleaned by one separator which removes all the foreigner particles (stalks, straw) with a large opening size sieve and a cyclone. Then it is ground in a first roller mill and the bran, which contains some stones of the same size, is separated by a sifter at the first floor. The meal, which goes through a second roller mill, is ground again and the bran is separated by a second sifter at the first floor and so on with four roller mills in series. The milling yield is 80 %. The mabele meal still contains some bran and germ as people like in the Northern Province and particle size of the meal can be coarser or finer according to the space between cylinders and the opening size of sieves. The mabele meal is sold in the factory depot or in shops in villages around: 110 rands a 80 kg bag, 69 rands a 50 kg bag, 35 rands a 25 kg bag and 18 rands a 10 kg bag. The bran is sold 450 rands per ton for animal feed. Farmers can bring their own sorghum grain to the mill and

exchange it with a mabele meal bag by paying for the custom milling: 3 rands for a 20 l tin, 5 rands for a 40 l tin, 7.5 rands for a 60 l tin and 10 rands for a 80 kg bag.

c) Discussions with consumers (Hlahlolalang Community Group) in the Western District at Madida (suburb of Potgietersrus)

We have met with Ms Nyakallo Moletsane and all of the six students from the University of the North involved in our project, an association of women named Hlahlolalang in an area near Madiba village. We have started by an open discussion with the women on the consumption of sorghum and millet in this area before the interview of each of them by the students following the questionnaire.

Sorghum, maize and millet are consumed in this area. Sorghum is prepared as bogobe a thick porridge at the main meals, motogo a thin porridge for breakfast, beer, mageo a fermented thin porridge drunk as a beverage, lewa as a snack (whole sorghum grain boiled for about 2 hours with whole beans) and senkgwa which are small ball shape sorts of breads made from whole sorghum flour added with water and salt. The women sometimes buy crushed grains for chicken feed. Millet is also used for bogobe, beer, thin porridge, ting (fermented thin porridge) and maize as “pap” a thick porridge at lunch or dinner. People consume and like sorghum as well as maize but do not eat a lot of millet because it does not grow in this area and since millet is not available, they cannot precise their preferences, and tell which cereal they prefer.

The women buy the grain to farmers and grind it into whole flour at home by using a stone mill. When there is a ceremony in the family, wedding or funerals, they prepare sorghum tin, beer, pap and can buy sausages, rice but it is much more expensive than the other cereals. Thick porridge is accompanied by a sauce and spinach prepared from bean leaves (morogo).

Sorghum is available all through the year. For the babies, soft porridges are prepared from only mabele meal and added with milk and sugar because mabele meal is less expensive than maize meal, healthier and efficiently stops rushes.

The women have mentioned that everybody initially eats sorghum daily but now some choose not to eat sorghum, so they get illness and they have mainly problem of health with their children.

d) Analysis of the results of the surveys led by the students in the Northern Province

• *Methodology*

The surveys led by the students are not already completed. They expect to complete the report on December. The surveys started in mid-July. They have already filled 278 questionnaires (118 producers, 100 consumers and 60 shopkeepers) in all the seven districts of the Northern Province except Bushvelt and Bushbuckridge Districts. They have visited 13 villages: 2 in the Northern District, 4 in the Southern District, 3 in the Central District, 2 in the Lowveld District and 2 in the Western District (see the map page 88). The processor survey will begin at the end of August.

Regarding the surveys methodology, the process was always the same: they first went to the Department of Agriculture to find out which are the places in the Northern Province that produce sorghum and millet. Then they contact the chief of the village who organises for them a meeting with the selected local communities with which they have a discussion. At the end of the discussion, they filled the questionnaires (see the questionnaires as appendix page 61).

- *Main results*

Compared to other provinces in the country, farmers in the Northern Province are very poor. Most of their incomes comes from the pensions (580 rands per month) paid by the government to old persons (more than 65 year old for men and 60 for women). Besides those pensions, the farmers can get incomes from their children who work out of the household in urban areas or from the cattle they have, or vegetables. Farming activities are devoted to household consumption.

Generally, farmers in the Northern Province grow sorghum and millet for their own consumption. Anyway, the poor soil and the dry weather conditions that they have in most part of the Northern Province are not suitable for maize. It is difficult to know if they grow sorghum and millet because they like it, or if it is because nothing else can grow in this area. If they have surplus, they find difficult to sell it on the market.

Sorghum and millet are staple food in this part of the Northern Province: the farmers can have it three times a day for breakfast, lunch and dinner. The main dishes made with these cereals are “bogobe”, “motogo”, “makhéou” and “léwa”³ :

- “Bogobe” is a thick porridge made from sorghum or millet flour poured into boiling water. It is eaten usually with a sauce with vegetables and meat or fish if available. In the rural areas, farmers eat “bogobe” with a spinach sauce made from beans leaves ;
- “Motogo” is a thin soft porridge consumed usually with milk and sugar at breakfast. When the flour in water is left 1, 2 or 3 days (depending on the weather conditions and if a starter is used) for fermentation, the soft porridge made from it is named “tin”;
- “Mageo” is a fermented beverage made from sorghum flour: sorghum flour in water is cooked, added with wheat flour and sugar, and is let overnight or one or two days for fermentation and drink.
- “Lewa” is a snack made from a mixture of whole sorghum grain and bean grain cooked into boiling water during two hours. Sometimes crushed groundnuts are added. Before cooking the day before, the grain is soaked into water.
- “Senkgwa” are sorts of ball shaped breads made from sorghum flour, water and salt and steamed. Wheat flour and yeast can be added to make the dough.

Most of these dishes are not available in the restaurants, but you can find maize “bogobe” or sorghum “bogobe” in shops in the rural areas.

4.3. Other persons met

a) Discussion with Juliana Rwelamira :

We met Juliana Rwelamira from the Post Graduate School of Agriculture and Rural Development. She has written a report in 1997 on an analysis of the food security situation in the Northern Province of South Africa. This work was undertaken by the University of Stellenbosch, Department of Agricultural Economics, Eastern Cape for CSIR-FOODTEK. Some data from that report should be useful for us.

She is now involved in an EU funding project with Botswana, India, Italy (University of Florence) and UK on the relationship between rural quality and demographic decision, for instance fertility and immigration or production-environment and utilization of local resources. Surveys were conducted with 600 households in 24 villages in the Northern Province. Food security is one of the issues and information on sorghum and other local

³ All these terms are in Sotho.

resources consumption will be available later because if data collection has already been done, all the data are presently on analysis.

Juliana underlined that it is very difficult to find out data in South Africa especially before 1994. She gave us some figures from an annual statistics report published by the Department of Agriculture Economics in the University of Pretoria and recommended us to contact Dr Moraka Makhura of that department to get more figures.

b) Visit to ARC-Institute for Agricultural Engineering

This institute in Pretoria provides a technology transfer between farmers and entrepreneurs. In the department of mechanization, the Plant Production Mechanization Programme aims at the promotion of the optimisation of mechanization needs through research, development and advisory services, and the Product Processing Programme is aimed at the promotion of technology for the processing of agricultural products for communities, commercial farmers and entrepreneurs. The areas of focus are: the development of mechanized appropriate implements, the development of effective and low cost mechanization systems for small-scale farmers, the evaluation and development of new product processing equipment, engineering advice and training support.

This department has for instance already designed a threshing machine for sunflower, sorghum and maize which was built by Impletek, Bothaville, Free State (cost: 5000-6000 rd) or also a hand mill which is built now in Tamsa, Port Elisabeth, Eastern Cape. This company commercializes also other mills (manual Bentall mill, a roller mill 300 kg/h with a diesel or electric motor) and shellers for small-scale farmers or entrepreneurs.

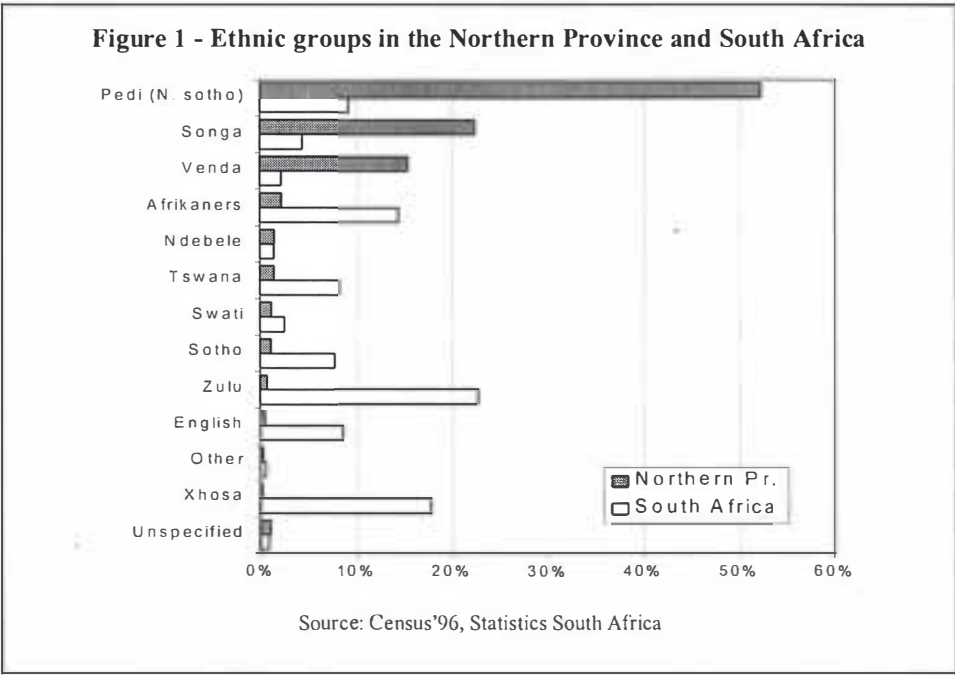
c) Visit to the French Embassy

Before leaving South Africa, we wished to make a debriefing of our mission to the representative of CIRAD in South Africa Jean-Paul Loyer but since he left before our departure for some vacation in France, we have met Jean-Pierre Gay from CIRAD. To get a new extension of our project, he suggested us to answer the next apply from SACCAR and Patrick Caron from CIRAD who is supposed to leave Botswana at the end of September should give us all the information. Since all the data were not ready to be analysed during our stay, a second mission seems to be necessary before the end of the project and the need to change running costs into travel costs should be discussed with Maurice Izard.

4.4. Background information

a) Development profile of the Northern Province

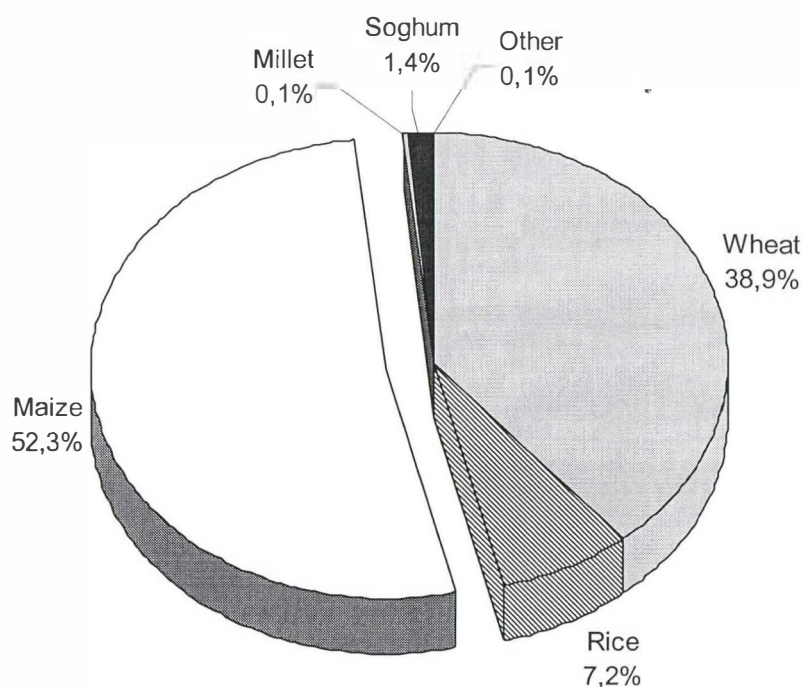
The Northern Province is one of the poorest regions of South Africa. With 5 million people (12.6% of South Africa’s population), the Northern Province accounts for only 3% of the country gross domestic product (GDP). Per capita GDP is by far the lowest in the country: only the quarter of the national average, but between 6 and 15 times higher in the rest of the province than in the former homelands. Most of the inhabitants (70%) live in rural areas, 20% in informal urban settlements and 10% in proclaimed towns. The population is mostly composed of Black Africans, mainly Pedi ⁴ (52%), Songa and Venda people (Figure 1). The population is predominantly young (close to 50% in 0-14 age group), with a prevalence of women (60% in 15-64 age group) as a result of high male absenteeism (37% employed outside the province as migrant workers). Moreover, the Northern Province has the highest annual population growth rate of the country (3.4%) ⁵.



⁴ Also known as Northern Sotho

⁵ For demographic data, see Census'96, Statistics South Africa (<http://www.statssa.gov.za>).

Figure 2 - South Africa cereal consumption in 1998



Source: FAOstat, 1999

The Northern Province is classed as arid to semi-arid with a limited water resource. The climate is generally subtropical with a great diurnal range during winter. The average rainfall varies between 635 and 380 mm per year, but droughts are frequent. The rainy season runs from October to March. The rainfall increases from north to south and from west to east. Only 14% of the territory are arable land.

b) Data on sorghum and millet production, processing and consumption in the Northern Province

Sorghum is the third cereal grown in South Africa. Besides more than 200.000 tonnes last year, sorghum is still far behind maize and wheat. There is no available figures for millet production in the Northern Province, but according to FAO estimations it represented roughly 11.000 tonnes in 1999, that means only 0.1% of the country cereals production (Figure 2).

Sorghum in the Northern Province represents only 2% of the national production (Table 1). However, it seems that sorghum and millet cultivation plays an important role in local farming.

Table 1 - Final estimate production of sorghum for the 1998/1999 season in RSA

Provinces	Production (tons)	% of total
Free State	83 000	53,2%
Mpumalanga	40 000	25,6%
North West	19 000	12,2%
Gauteng	10 000	6,4%
Northern Province	3 000	1,9%
Eastern Cape	750	0,5%
Kwazulu-Natal	200	0,1%
Total	155 950	100,0%

Source: South African Grain Information Service

In South Africa, maize is the main staple food. Sorghum is consumed in three main ways: malt (for industrial or commercial beer), meal (flour, grits) and animal feeds (pet and poultry). Malt was an important outlet for sorghum, but sorghum beer is more and more in competition with clear lager. While sorghum products for malt and feed are constantly going down, meal consumption was increasing every year of 6% between 1987 and 1999, that means faster than the population growth (2.7%) during the same period (Figure 3).

Table 2 - Retail price of some cereals in the Northern Province (Potgietersrus)

Cereal	Product name	Product type	Weight (kg)	Price (rand)	Price per kg	Brand	Origin
Sorghum	Mbalele Thoro	Flour	10,0	19,99	2,00	Progress Milling	Pietersburg
Sorghum	Mabela	Flour	5,0	12,99	2,60	NTK Mills	Potgietersrus
Maize	Super Maize Meal	Flour	5,0	14,99	3,00	Tiger Milling	Germiston
Sorghum	Mabela	Flour	2,5	7,70	3,08	NTK Mills	Potgietersrus
Maize	Super Maize Meal	Flour	2,5	7,99	3,20	Tiger Milling	Germiston
Wheat	Golden Cloud Cake Flour	Flour	5,0	24,99	5,00	Tiger Milling	Germiston
Maize	Maize rice	Rice	1,0	6,50	6,50	Golden Dice	Vosterkroon
Rice	Long rice	Rice	5,0	32,99	6,60		
Rice	Long rice	Rice	1,0	7,99	7,99		

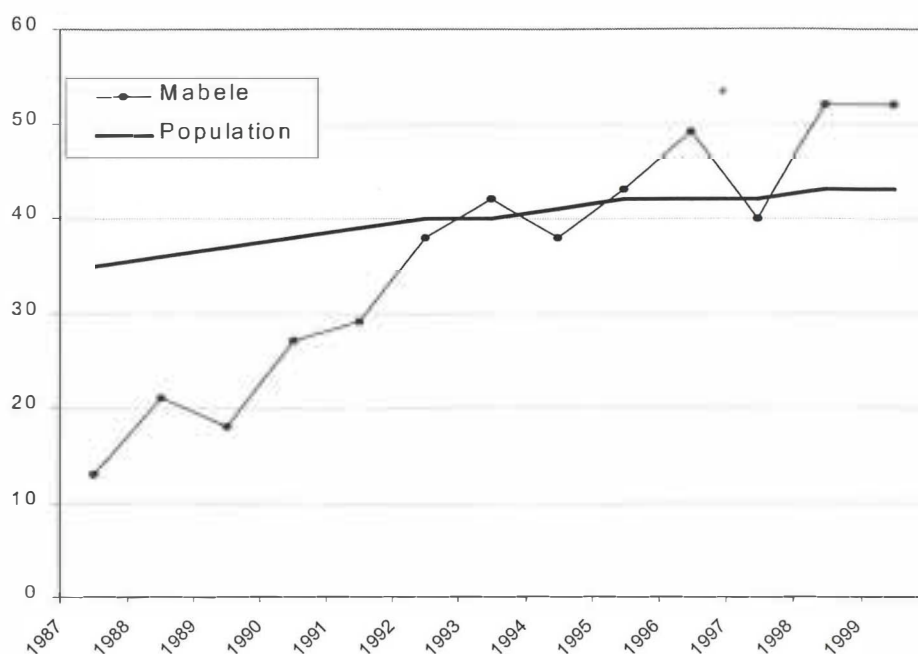
Source: Our inquiries in August 2000

Table 3 – Retail price of some cereal based products in South Africa

Products	Price (rand per kg or litre)
Mealie meal	2.45
Mealie rice	2.57
Sorghum meal	3.15
Wheat cake flour	3.72
Rice	4.40
Prepacked sorghum beer	1.90
Lager beer	6.35

Source: Statistical Release P0141.3, Central Statistical Service, Stats SA

Figure 3 – Evolution of sorghum mabele meal consumption (thousand tonnes) and population growth (million of people) in South Africa between 1987 and 1999



Source: SA Sorghum Board for Mabele Meal and US Census Bureau for Population

However, maize remains the cheapest cereal in South Africa even if sometimes sorghum can be very affordable (see Table 2 and Table 3). In Table 2, "super maize meal" is a high quality flour made with the vitreous part of the maize grain, that is why it appears more expensive than sorghum meal.

5. Analysis and discussion

Even if all the surveys were not already completed, several main tendencies can be outlined right now:

In town, people eat mainly maize as a thick porridge called *pap*. They never consume millet. Maize is the favourite cereal to make *pap*, and it would be interesting to know for what reasons urban consumers do not use sorghum to prepare *pap* (is it a problem of colour, taste, texture, other?). Even if sorghum is known by the majority of them, urban consumers eat it only as a thin, soft porridge for the breakfast, or in the form of fermented drink or fermented soft porridge (tin). They buy the mabele meal directly in the supermarkets in all the province. Mabele meal is a little bit more expensive than maize meal. This mabele meal is produced at industrial or semi-industrial level by mills in the province such as Progress Mills or maybe in other provinces in South Africa but we never saw imported flours in shops. All of these milling companies buy the sorghum grain in Kwazulu-Natal and Mpumalanga provinces but never in the Northern Province.

In rural areas, people consume what they grow: mainly sorghum and millet which are better adapted to the drought conditions and some time to time maize. They can buy these grains in local markets if they are not available in enough quantities in fields. They process the whole grain into flour by using a stone mill at home or a hammer mill when available in the village. It seems that millet is their favourite cereal: when they grow it, it is only for their own consumption because threshing is more time consuming and tiring than for sorghum.

To develop sorghum production, consumption and marketing in the Northern Province, it is necessary to promote the sorghum products in urban areas.

For sorghum, it should be more relevant to industrialise existing dishes (ready made soft porridge for the breakfast or ready made “tin”) and in a second step, when sorghum will be cheaper and more available, to diversify sorghum products (biscuits, pasta, pop sorghum, breakfast cereals for instance) or add sorghum in cereals based products (composite flour).

For millet, which is unknown by urban populations, it should be useful to introduce millet based recipes from other African countries (for example couscous, kiswa) showing them the range of attracting dishes that are possible to make with this cereal. But this approach deals with the problem of new product development that involves consumer studies on perception, promotion, marketing...

These upper suggestions to increase sorghum and millet consumption in towns, are not enough for a real impact on agriculture in the Northern Province. If we want that processors buy cereals to producers, it would be necessary that farmers organized themselves in groups to collect, threshen, clean and store the grains. Storage co-operatives should be settled and contracts between farmers and processors should be set up to have a constant supply of quality grains to the milling companies.

All of these propositions will depend on the surveys final results and quantitative surveys at urban level, according to the following work programme.

6. Work programme for the continuation of the project

The student report should be completed by the end of December. The team in Montpellier will analyse the results and make proposition for the quantitative study questionnaire. A student of the University of Pretoria will be contacted to conduct the quantitative study in Pietersburg under Tshidi Moroka supervision. The data will be processed by TfD in South Africa and complete in Montpellier with the help of SEA team for the result analysis. A last mission of a food technologist from Montpellier will be held in South Africa to identify technical solutions to the questions risen by the study and organize a meeting of restitution with the millet and sorghum stakeholders (farmers, processors, traders, restaurant owners and consumers).

Planning:

- September: a student of the University of Pretoria will make the literature review, which should be completed by the end of November
- December: Final report of the students
- December-January: Analysis of the results (report + mission + data collected) and questionnaire preparation for the quantitative survey in Pietersburg
- February: quantitative survey in Pietersburg
- March-April: Analysis of the quantitative survey results (including a mission of a TfD team member in Montpellier to make and discuss the data analysis)
- May: Mission of a food technologist for identification of technical solutions
- June- July: Final report writing
- September: Meeting with stakeholders.

7. Appendix

7.1. Schedule of the mission (from August 7th to 27th)

Date	Time	Activities
August 7 th	13 h 30	Departure from Montpellier to Johannesburg via London
August 8 th	07 h 35	Arrival at Johannesburg International Airport
	09 h 05	Arrival in CSIR in Pretoria
	09 h 45	Arrival at the Bushwillow Guest House
August 9 th		National Woman's Day. Preparation of the mission
August 10 th	08 h 10	Meeting with Mrs Tshidi Moroka at CSIR
	09 h 30	Visit to Dr Marthinus Horak at CSIR
	09 h 45	Visit to Dr Terry Watson at CSIR
	14 h 00	Presentation of TFD Team by Ms Elaine Jacob
August 11 th	09 h 05	Presentation of CIRAD to Technology for Development Programme Team
August 12 th	09 h 30	Trip to Sterkfontein Caves and Rhino and Lion Reserve
August 13 th	12 h 00	Report writing. Lunch at Dave's
August 14 th	10 h 00	Meeting with Mr Jean-Pierre Gay, Jean-Paul Loyer and Pierre Colombier at French Embassy
	12 h 45	Visit to Dr Sylvain Perret at the University of Pretoria
	12 h 15	Meeting with Pr John Taylor at the University of Pretoria
	14 h 30	Meeting with Mr Dave Harcourt at CSIR
	17 h 00	Departure for the Northern Province
	19 h 30	Arrival in Pietersburg
August 15 th	08 h 00	Departure from the lodge
	08 h 30	Meeting with Ms Nyakallo Moletsane at the University of the North
	10 h 00	Meeting with the Staung Agricultural Project community group (farmers) in the Southern District at Mamone and interview with the students
	14 h 00	Meeting with Petrus Mohlala, sorghum and millet processor at Mamone
	17 h 00	Lunch with Tshidi Moroka and Nyakallo Moletsane in Pietersburg
August 16 th	11 h 30	Meeting with the Hlahlotalang Community Group (consumers) in the Western District at Madida (suburb of Potgietersrus) and interview with the students
August 17 th	09 h 15	Mr Eric Platt, Managing Director, Progress Mills Company in Pietersburg
	11 h 00	Meeting with Pr Naftal Mollel, Associate Dean of the Faculty of Agriculture, University of the North, Northern Province
	14 h 00	Meeting with Ms Nyakallo Moletsane and the students at the University of the North
August 18 th	10 h 00	Meeting with Ms Nyakallo Moletsane and the students at the University of the North
	15 h 00	Visit to Mabele Meal near from Pietersburg
	18 h 00	Departure for Pretoria
August 19 th		Report writing
August 20 th		Report writing
August 21 st	08 h 00	Collecting data and references on sorghum and millet in RSA
August 22 nd	08 h 00	Collecting data and references on sorghum and millet in RSA
	14 h 30	Meeting with Mr Victor Ndikira and Mrs Tshidi Moroka at CSIR
August 23 rd	08 h 30	Meeting with SAFPP at CSIR
	11 h 30	Meeting with Neil Armitage, Consultant, at CSIR
	12 h 00	Report writing at CSIR
August 24 th	08 h 00	Report writing at CSIR
August 25 th	09 h 00	Meeting with Mrs Juliana Rwelamira at the University of Pretoria
	10 h 00	Meeting with Mr Jean-Pierre Gay and Tshidi Moroka at French Embassy, and debriefing of the mission
	13 h 00	Lunch at the National Research Foundation (NRF)
	15 h 00	Visit to ARC-Institute for Agriculture Engineering and meeting with Mr Dirk Hanekom
August 26 th	11 h 00	Departure to Johannesburg : visit of Soweto
	19 h 00	Departure from Johannesburg
August 27 th	12 h 45	Arrival in Montpellier via London

7.2. Details of the persons met in South Africa

Name	Surname	Gender	Position	Title	Company or Institution	Department	Postal Address	City	Phone	Facsimile	Cellphone	E-mail
Douglas Jerome	Brown	M	Agribusiness Advisor		US-AID	U.S. Department of Agriculture	1325 G St., NW, Suite 400, Washington, DC 20002	Washington	202 219 04 50	202 219 05 08		jbrown@afr-sd.org
Pierre	Colombier	M	Counsellor for Science Culture & Development		Embassy of France		PO Box 29086, Sunnyside 0132	Pretoria	12 429 70 45	12 429 70 47		culturel@iafrica.com
Janice	Dewar	F	Business Development and Integrated Projects	Dr	CSIR	Environmentek	PO Box 395, Pretoria 002	Pretoria				
Busi	Dube	F	Community Trainer		CSIR	Bio/Chemtek, Technology for Development Programme	PO Box 395, Pretoria 001	Pretoria	12 841 36 61	12 841 37 26		bdube@csir.co.za
Jean-Pierre	Gay	M	Co-operation Attaché	Dr	Embassy of France		PO Box 29086, Sunnyside 0132	Pretoria	12 429 70 45	12 429 70 47	083 380 05 98	culturel@iafrica.com
Dave	Harcourt	M	Responsible for the Strengthening African Food Processing Project	Dr	CSIR	Bio/Chemtek, Technology for Development Programme	PO Box 395, Pretoria 001	Pretoria	12 841 30 97	12 841 37 26		dharcourt@csir.co.za
Dirk	Hanekon	M	Engineer		ARC	Institute for Agricultural Engineering (ILI)	Private Bag X519, Silverston 0127	Pretoria	12 842 40 54	12 842 43 18		Wkt8@ing1.agric.za
Marthinus	Horak	M	Programme manager	Dr	CSIR	Bio/Chemtek, Bioprospecting Programme	PO Box 395, Pretoria 001	Pretoria	12 841 26 70	12 841 47 90	082 458 38 57	mhorak@csir.co.za
Elaine	Jacob	F	Food Technologist		CSIR	Bio/Chemtek, Technology for Development Programme	PO Box 395, Pretoria 001	Pretoria	12 841 44 10	12 841 37 26		ejacob@csir.co.za
Thabang	Jase	M	Business Management Trainer		CSIR	Bio/Chemtek, Technology for Development Programme	PO Box 395, Pretoria 001	Pretoria	12 841 34 34	12 841 37 26		tjase@csir.co.za
Queen	Kgabo	F	Secretary		CSIR	Bio/Chemtek, Technology for Development Programme	PO Box 395, Pretoria 001	Pretoria	12 841 37 25	12 841 37 26		qkgabo@csir.co.za
Jean-Paul	Loyer	M	CIRAD Representative		CIRAD		PO Box 70793, Bryanston 2021	Pretoria	11 706 77 83	11 706 76 54	082 607 40 03	jployer@global.co.za
Moraka	Makhura	M	Lecturer		University of Pretoria	Faculty of Natural and Agricultural Sciences, Department of Agricultural Economics	Pretoria 0002	Pretoria				mmakhura@postino.up.ac.za

Nyakallo	Moletsane	F	Lecturer	Dr	Univeristy of the North	Faculty of Agriculture, Department of Agricultural Economics	P/Bag X1106, Sovenga 0727					
Naftal	Mollel	M	Associate Dean	Pr	Univeristy of the North	Faculty of Agriculture, Department of Agricultural Economics	P/Bag X1106, Sovenga 0727		15 268 22 03	15 268 28 92		molleln@unin.unorth.ac.za
Tshidi	Moroka	F	Programme manager	Dr	CSIR	Bio/Chemtek, Technology for Development Programme	PO Box 395, Pretoria 001	Pretoria	12 841 26 49	12 841 37 26		mmoroka@csir.co.za
Nedienne	Naidoo	F	Food Technologist		CSIR	Bio/Chemtek, Technology for Development Programme	PO Box 395, Pretoria 001	Pretoria	12 841 44 10	12 841 37 26		nedienne@hotmail.com
David	Nchabeleng	M	Food Technologist		CSIR	Bio/Chemtek, Technology for Development Programme	PO Box 395, Pretoria 001	Pretoria	12 841 26 44	12 841 37 26		Knchabeleng@csir.co.za
Sylvain	Perret	M	Associate Professor	Dr	Univeristy of Pretoria	Faculty of Natural and Agricultural Sciences, Department of Agricultural Economics	Pretoria 0002	Pretoria	12 420 32 80	12 420 32 47	082 960 71 89	sperret@nsnper1.up.ac.za
Eric	Platt	M	Managing Director		Progress Mills		PO Box 386, Pietersburg 0700	Pietersburg	15 297 34 52	015 297 48 35	083 654 59 91	platte@iafrica.com
Juliana	Rwelamira	F	Associate Director		Univeristy of Pretoria	Post Graduate School of Agriculture and Rural Development	Pretoria 0002	Pretoria	12 420 42 26	12 420 32 06		jrwelami@postino.up.ac.za
John	Taylor	M	Professor	Pr	Univeristy of Pretoria	Department of Food Science			12 420			
Terry	Watson	M	Programme manager	Dr	CSIR	Bio/Chemtek, Molecular Biotechnology Programme	PO Box 395, Pretoria 001	Pretoria	12 841 28 97	12 841 36 51		twatson@csir.co.za

7.3. Questionnaires used by the students in the Northern Province

PRODUCTION

1. Particulars of the respondent

- 1.1 Study Area
- 1.2 Region.....
- 1.3 Name of the farmer
- 1.4 Are you the household head
- 1.5 Do you own farm land (yes/no)
- 1.6 If not, what is your relationship with the farm land owner?

2. Household Profile

2.1 Size of Profile

Family/member	Age	Gender	Marital Status	Education	Occupation	Farm work participation
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

Codes

Marital Status	Education	Occupation	Farm work participation	Gender
0 = Single	0 = Never	0 = Unemployed	0 = Not	0 = Male
1 = Divorce	1 = Grade 1-7	1 = Other	1 = Full time	1 = Female
2 = Window(er)	2 = Grade 7 – 12		2 = Part time	
3 = Married	3 = Tertiary			
	4 = Other			

3. Production

3.1 Do you grow millet? Yes/no

.....
If yes, complete this table below:

3.2 Do you grow sorghum? Yes/no

.....

If yes, complete the table below:

Crops	Area	Production (2000)	Production (1999)
Millet			
Sorghum			
Maize			
Beans			
Groundnuts			

If no for millet, why not?

If no for sorghum, why not?

3.3 Marketing

Crop	Qty sold	Price	Qty consumed	Qty stored	Buyer
Millet					
Sorghum					

3.4 What type of storage do you have?

3.5 Is stored millet maintain good quality and marketable ?

3.6 Is stored sorghum maintain good quality and marketable?

3.7 When do you think is good time to sell millet and why?

3.8 When do you think is good time to sell sorghum and why?

3.9 Do you encounter any marketing problem of these two grains?

3.10 Fertiliser applications:

Crop	Fertiliser type	Qty applied
Millet		
Sorghum		

3.11 Is production of these two grains increase / decrease as compared to previous seasons?
If decreasing, Why

If no, why not?

3.12 Do you have an access to extension officer? If yes/no,

If yes, which advice you ever received from he/er concerning millet production problems

If no, why

3.13 Are you a member of any farmer association or co-operatives (yes/no)?

3.14 Do you take your millet production to processing firms? Yes/no

if yes, complete the accompanying table

Crop	Qty processed	Processing costs	Distance/km

If no, why

3.15 Is there any new development of hybrid seeds from where you purchase your seeds?
Yes/no

If no, what do you think is the problem

3.16 Do you have any production constraint with millet? yes/no

If yes, what are they?

3.17 Do you have any production constraint with sorghum? yes/no

If yes, what are they?

3.18 According to your opinion, what do you think is the problem for people not growing millet?

.....

.....

.....

3.19 According to your opinion, what do you think is the problem for people not growing sorghum?

.....

.....

.....

3.20 What do you think must be done to encourage people to grow millet?

.....

3.21 What do you think must be done to encourage people to grow sorghum?

.....

.....

CONSUMPTION

1. Particulars of the respondent:

- 1.1 Study area
- 1.2 Region
- 1.3 Name of the respondent
- 1.4 Are you a household head
- 1.5 If not what is your relationship with the household head

2. Consumption questions:

- 2.1 Do you buy millet? Yes, No
 - 2.2 Do you buy sorghum? Yes, No
- If yes, complete the table below:

Crop	Place bought	Qty bought	Prices	Type

2.3 If no in 2.1, why not?

.....

.....

.....

2.4 Do you buy millet based products? Yes, No

2.5 If no why not?

2.6 Do you buy sorghum based product? Yes, No

2.7 If no why not?

If yes to 2.4 and 2.5, fill the following table

Type / name of product	Quantity	Price	Place

2.8 What do you buy millet for? (animal feed / food consumption)

2.9 What do you buy sorghum for? (animal feed/ food consumption)

2.10 If you buy human consumption, how often do you consume millet per week?

2.11 If you buy for human consumption, how often do you consume sorghum per week?

2.12 What is millet mostly used for in this area?

2.13 What is sorghum mostly used for in this area?

2.14 Why don't you eat more of millet (price/ taste/ availability)?

2.15 Why don't you eat more of sorghum (price/ taste/ availability)?

2.16 Is millet available throughout the year from where you buy it? Yes

No

If no what do you think is the constraint ?

2.17 Is sorghum available throughout the year from where you buy it? Yes, No

If no what do you think is the constraint?

2.18 For which meal do you mostly use millet for?

Breakfast

Lunch

Supper

2.19 For which meal do you mostly use sorghum for?

Break

Lunch

Supper

2.20 Is there any special occasion where millet is mostly preferred and why?

Wedding

Traditional ceremony

Other

2.21 Is there any special occasion where sorghum is mostly preferred and why?

Wedding

Traditional ceremony

Other

2.22 Which grain do you consume mostly and why?

2.23 When millet is not available, what do you use instead?

2.24 When sorghum is not available, what do you use instead?

2.25 Who consumes millet most (young/old/ women/ men) and why?

2.26 Who consumes sorghum most (young/ old/ women/ men) and why?

2.27 Is there a difference in price of millet and other grains you consume? Yes, No

If yes, is millet cheaper or expensive?

2.28 Is there a difference in price of sorghum other grains you consume?

Yes, No

If yes, is sorghum cheaper or expensive ?

2.29 According to your opinion, why people do not consume millet?

2.30 According to your opinion, why people do not consume sorghum?

PROCESSORS

1.1 Study area

1.2 Region

1.3 Name of the respondent

1.4 Are you the owner/manager here (yes/no)

1.5 If not, what is your relationship with the owner?

2

2.1 Do you process sorghum? (yes/no)

2.2. Do you process millet? (yes/no)

If yes, complete the table below

Maize/kg	Sorghum/kg	Millet/kg	Wheat/kg

If no, why not?

2.3 How is the processing of these small cereals compared to those of maize (time/cost)

2.4 What type of grain is mostly processed here and why?

2.5 What is the common usage of these cereals (maize/sorghum/millet) in this area?

2.6 When do you see an increase in the processing of millet and why?

2.7 When do you see an increase in the processing of sorghum and why?

2.8 In your opinion, how is millet percieved?

2.9 In your opinion, how is sorghum percieved?

RESTAURANT

- 1. Study area
- 1.2 Region
- 1.3 Name of the respondent
- 1.4 Are you the restaurant owner (yes/no)
- 1.5 If not, what is your relationships with the owner

2.1 Do you have dishes prepared of millet? yes/ no
If no, why not

2.2 Do you have dishes prepared of sorghum? yes/no

2.3 Millet and Sorghum based dishes (complete the below table)

Type	Dish	Meal	Price

- 2.4 How is the demand (high/low) for these dishes?
- 2.5 Which one of these dishes is preferred by your customers?

2.6 What type of people prefer these meals (old/ young/ men/ women/ urban/ rural) and why?

2.7 What is the most preferred cereal in your restaurant and why?

2.8 What is your opinion about millet?

2.9 What is your opinion about sorghum?

7.4. Presentation of the Community Development Programme

INTRODUCTION

The Progress Milling Community Development Programme is a forum that co-ordinates and encourages rural communities in the Northern Province who have traditionally been maize users to become participants in the cultivation of maize.



The empowerment of previously disenfranchised communities on the one hand, and the need for household food security on the other, are aims which have been set by the government for social and economic upliftment programmes.

The provincial government alone cannot create the miracle which is needed to transform agriculture in our province due to limited human and financial resources. What is needed is private enterprise to form partnerships with Government and previously disenfranchised communities at grass roots level to create a climate which is conducive for such participation.

The provincial government alone cannot create the miracle which is needed to transform agriculture in our province due to limited human and financial resources. What is needed is private enterprise to form partnerships with Government and previously disenfranchised communities at grass roots level to create a climate which is conducive for such participation.

The main aim through this programme is:

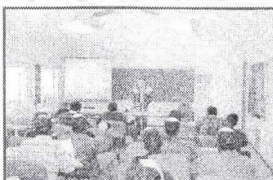
- To establish a viable agricultural economy in the Northern Province;
- To improve production practices of the small scale farmer;
- To increase the level of household food security;
- To generate economic activity at community level;
- To uplift communities by means of improved infrastructure and human development;
- To create more employment in rural areas.

The programme further assists the small scale farmers in rural communities by facilitating access to:

- Extension support;
- Input supplies;
- Infrastructure support;
- Training / capacity building;
- Agricultural information; and
- The market.

Purpose of Trust

A Trust was established as a special fund in the Republic of South Africa, for the sole purpose of receiving funding to be used exclusively for the defrayal of expenditure directly incurred in providing education and training.



Principal objectives of Trust

- To provide funds to educational institutions of a public character, within the Republic of South Africa which are themselves exempted from payment of income tax in terms of Section 10 (1) (f) of the Act
- To encourage commercial, industrial and other relevant financial undertakings to fund the Trust.

Aim of Trust

To assist and equip small scale farmers in rural areas with skills to become successful farmers through the sponsoring of training initiatives, offered by relevant training institutions.



Sponsorships should be directed to:

Progress Milling Educational Trust

First National Bank Pietersburg

Branch code: 260148

Account no: 62010803866

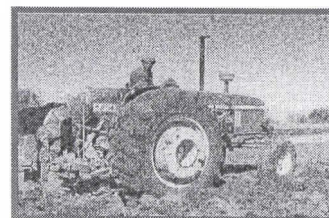
Correspondence should be forwarded to:

The Chairman
Progress Milling
Educational Trust Fund
P.O. Box 386
PIETERSBURG
0700

Tel: (015) 297-3452

Fax: (015) 297-4835

E-mail: PROGRESS_MILLING@MWEB.CO.ZA



7.5. Map of the Northern Province

The next page shows a map of the Northern Province (© Map Studio MM). The dots (•) indicate the places visited by the students.

