Mountain farming in Lesotho: can wool and mohair production be a pivot for sustainable development of the rural mountains?

Agrarian diagnosis in the Sehonghong valley

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Acknowledgements

First of all, thank you to all the farmers of Matsoaing for their kindness and hospitality. « U ea kae? » « U tsoa kae? »

A thought for the family Nyaphisi, thank you for your good mood everyday, and don’t forget: « be flexible », because « I want you to be well »! We won’t forget the super bread of ’Me Mampine that « you eat well to have energy » with peanut butter. Thank you to the beans, the split peas, and to the whole farmyard for the fun!

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We thank all the PELUM’s staff, and particularly to Ntate Moshe and ’Me Gladys to have trusted and supported us.

We won’t forget Peter and Bryan for the precious help to avoid this report to be a collection of « bugirls », and for the time-consuming and boring job you had to do!

Of course, thank you to our families, without whom we wouldn’t be here today. A special thought for you Papa, up there.

And thank you, you
But we do not acknowledge the rooster...
### Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intercropping</strong></td>
<td>Cropping of two or more crops simultaneously, in the same ground and close from each other (the interaction between the plants is effective)</td>
</tr>
<tr>
<td><strong>Multiple cropping</strong></td>
<td>Cropping of two or more crops on the same field, during the same year, but the interaction between the two crops is not effective.</td>
</tr>
<tr>
<td><strong>Sourveld</strong></td>
<td>Sourveld is a veld/pasture type and refers to the low palatability of the veld.</td>
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</table>

### Sesotho vocabulary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baalisetsana</strong></td>
<td>Entrust a livestock owner with your cattle during summer. This is necessary for people who cannot pay for a herd-boy because it is forbidden to keep animals in the village area during summer.</td>
</tr>
<tr>
<td><strong>Letsema</strong></td>
<td>The farmer invites others to participate to his harvest of wheat. The owner provides everybody with traditional beer and gives a part of the harvest to each female worker.</td>
</tr>
<tr>
<td><strong>Letsoapung</strong></td>
<td>Steep slope</td>
</tr>
<tr>
<td><strong>Maboella</strong></td>
<td>Preserved grazing area so as to have grass for the following summer.</td>
</tr>
<tr>
<td><strong>Mafisa</strong></td>
<td>Livestock on loan. One borrows animals so as to benefit of the livestock produce (wool, mohair, cow dung, draught power etc.). Originally, this practice was from big livestock owners to small owners or to people who have own no animals.</td>
</tr>
<tr>
<td><strong>Matseng</strong></td>
<td>Place with plenty of water, in reference to the summer pastures at Sani Top.</td>
</tr>
<tr>
<td><strong>Matsoaing</strong></td>
<td>Reference to the study area as well as to the village pastures.</td>
</tr>
<tr>
<td><strong>Molamu</strong></td>
<td>Wood stick of the herd-boys</td>
</tr>
<tr>
<td><strong>Nokeng</strong></td>
<td>The river</td>
</tr>
<tr>
<td><strong>Seahlolo</strong></td>
<td>Share-cropping. The owner of the field does a share-cropping-out while the people cultivating his field are doing the share cropping-in.</td>
</tr>
<tr>
<td><strong>Sekoropo</strong></td>
<td>Little jobs for other (on the fields as in the household)</td>
</tr>
<tr>
<td><strong>Sepane</strong></td>
<td>Mutual aid for fieldwork. Some farmers group together and each of them participates with labour, tools or draught animals, according to what he possesses.</td>
</tr>
</tbody>
</table>
INTRODUCTION

The development of mountain areas is a subject high on the agenda of international agencies concerned with efforts to improve the welfare of mountain people of the world. In Lesotho, a small country, very mountainous, with only 10% of its surface arable, and surrounded by the economically powerful Republic of South Africa, the government has invested its efforts in wool and mohair production as a pivot for the development of the country, and particularly of the Highlands.

The initial hypothesis of this study is that wool and mohair production could eventually enable the mountain Basotho farmers to increase their income and thus, to permit a possible course for self-development in the Highlands.

In order to assess the prospect of enhancing wool and mohair production in the Highlands, the study had first to consider how currently the Basothos make a living in the rural mountains, the level of accessibility to all the farmers of wool and mohair production, and how these fibres are produced.

During a workshop organized in Maseru in 2006 about the mountain people of Southern Africa, it was stated that an inadequate access to markets is a major problem for these people (Mokute, 2006). Thus the study had also to consider market accessibility to the wool and mohair producers.

Furthermore, in the context of the limited availability of arable land, and difficulty of access to markets for traditional produce, the study also considered what other agricultural activities might be possible.

This report presents the results of a field study conducted in the Highlands of Lesotho, in the Sehonghong valley, from April to August 2008. The study aimed to answer the above questions by analysing farming practices, their productivity and income, and the level of access to markets by these farmers.

The context of the study and the methodology employed are presented first. Then, the characteristics of the farming environment in the valley are described. This is followed by an analysis of the transformation in this environment over time and the consequences for the farming activities. In order to understand, and explain the opportunities and constraints faced by these farmers, a technical and economic assessment of farming activities is then made. Finally, an overview of market accessibility completes this study, and together with the preceding analysis permits an idea of how this mountain agriculture could evolve.
THE CONTEXT OF THE STUDY

1 A demand from PELUM-Lesotho

PELUM association is a regional network of 210 Civil Society Organizations (CSOs) operating since 1993 in Southern and Eastern Africa, and working in the area of Participatory Ecological Land Use Management (PELUM). It focuses on small-scale farmers activities.

PELUM-Lesotho was legally registered in 2004 and is a membership-based CSO. It has about 40 members all over the country which comprise Non Governmental Organizations (NGOs) and Community Based Organizations (CBOs). The aim of PELUM-Lesotho is to enhance the capacities of the members in working toward sustainable local community livelihood and empowering small-scale farmers and farmers groups. It supports small-scale farmers and focuses on sustainable agriculture for food security and prosperity notably by proposing training, workshops and providing documentation and information about trade and rural development to farmers. Its purpose is to see communities in Lesotho become self organized to make choices towards an improved quality of life that is socially, economically and ecologically sustainable. The organization works through its members to reach individual farmers and their local associations in order to link the farmers of different parts of Lesotho for a networking and sharing of experiences.

Key areas of advisory strategy of PELUM-Lesotho are:
- Trade issues
- Food/seed security development
- Ecological sustainable agriculture and natural resource management

PELUM-Lesotho is for the moment mainly operating in the lowlands and foothills of Lesotho and is not yet working in the Highlands, notably in the Sehonghong valley of the Mokhotlong district where the present study takes place. The organization is planning to implement its first own project and develop a partnership with farmer groups in the most remote mountain areas of the country. Therefore, the demand has been made to have a study about the agrarian dynamics in the Matsoaing area to understand what are the main constraints and strategies/opportunities of the family farmers in the rural mountains of Lesotho and how PELUM could work with them.

2 A PELUM-Lesotho, GRET, ESAFF and WMPA collaboration

The Group of Research and Exchange of Technology (GRET) is a French organization, operating notably in Southern Africa, whose aim is to improve the livelihood of family farmers in the developing country.

The Eastern and Southern Africa Small Scale Farmers’ Forum (ESAFF) is an NGO which has been established, with the support of PELUM, in 2002 as a regional forum to bring together small scale farmers, livestock keepers and fishermen folks. It stands for a self reliant, independent and effective regional network that will empower national farmers forum to increase small-scale farmers’ visibility and preserve sustainable agriculture.

PELUM and GRET, in partnership with ESAFF and the World Mountain People Association (WMPA) are embarked in the creation of a Mountain Hub in Southern Africa by strengthening a multi-stakeholder network involved in improving rural livelihoods in the mountain areas. Since Lesotho is entirely mountainous, it has been chosen to welcome the headquarters. In Lesotho, this network will support PELUM members, notably ESAFF, throughout pilot activities, will document and disseminate their experience with mountain people in socio-cultural, technico-economic and
For the creation of this hub, different studies are being conducted in mountain areas. In Lesotho, the organizations are particularly interested in understanding the impacts of the partnership agreements between Southern Africa and the European Union on small-scale farmers. The study of the wool and mohair production, seen as being an important factor for the rural development in mountain areas, is one topic on which GRET is focusing.

For that reason, PELUM-Lesotho has established field research in order to understand the strategies of family farmers in the highlands of Lesotho, what is the importance of wool and mohair production in the rural mountains, and identify the constraints they are facing and raise their voice at the national and international level. The further steps would be to work with farmers through ESAFF. The demand has been made for an agrarian diagnosis. Furthermore, having an overview of the different accesses to markets, notably by understanding the wool and mohair commodity chain, was important to highlight the links between the outlets of the agricultural production and the agrarian dynamics.

The GRET is working closely with Supagro-University Institute for Tropical Rural Development, which teaches the methodology of the agrarian diagnosis, and two students of that institute have been chosen to conduct this study.

### 3 Geographical, social and economic context of Lesotho

#### 3.1 A small mountainous landlocked country

Lesotho is a landlocked country of 30,590 km² lying between latitude 28° and 31° South and longitude 27° and 30° East, proudly called “Kingdom in the Sky” or “Roof of Africa”.

![Map 1: The three main zones of Lesotho](image)

The Basotho nation was created by Moshoeshoe I, its first king, in 1830. Basutoland was a British protectorate from 1843 until 1966, when it acquired its independence and was named Lesotho. Although the king gained British protection, territorial wars that followed between Basothos and Boers made the nation definitely cede much of its rich farmlands at the west of the country. Nowadays only 10% of the country is arable land, this one being mainly in the Lowlands,
but it is gradually shrinking due to severe land erosion, and the rest is mainly range land (Ministry of Natural Resources, 2000).

It is entirely surrounded by the Republic of South Africa (map 1): bounded by the provinces of the Free State to the West and North, the Eastern Cape to the South, and Kwazulu-Natal to the East. Lesotho is the only country in the world with all its surface situated more at than 1000 m.a.s.l. (Ministry of Natural Resources, 2000). The Highlands, also called Maloti, comprise about 66 % of total land mass, ranging from 2000 to 3484 m.a.s.l.

3.2 A MIXED ECONOMY OF SUBSISTENCE FARMING, WOOL SHEEP AND MOHAIR GOATS HUSBANDERY

The Basothos practise a mixed activity of subsistence farming and animal husbandry. While the crop production, done with cultivation by hand and animal traction, provides food for the family, livestock production, and notably wool and mohair, is the main source of wealth.

Although 90 % of the population relies on subsistence and livestock farming (Lesotho Agricultural Report, 2007) and this proportion is even higher in mountain districts, the contribution of agriculture to Lesotho's Gross Domestic Product is only 16,5 %. The agriculture in the Highlands was developed after the overcrowding of the Lowlands, where the majority of the population is. With their wide grazing areas, the mountains of Lesotho have been used for livestock production, and particularly wool sheep and mohair goats. Nowadays, the sheep and goats raised are almost all Merinos and Angoras and are an important source of cash income in the Highlands. No processing industries exist in Lesotho and all the animal fibres are exported, representing 60 % of the value of total exports of Lesotho (FAO stat, 2004).

The majority of farmers live on subsistence farming, cropping mainly maize, wheat, beans and peas. But in the rural mountains of Lesotho, farmers are facing problems of severe pasture and soil erosion which both undermine crop and livestock production.

Since the settlement in the Highlands, the continuous single cropping and a high stocking rate have severely affected the natural resources on which the mountain farmers' survival is dependent. Furthermore the precipitation has become increasingly erratic, resulting in periodic droughts and hazardous farming conditions (Ministry of natural resources, 2000).

3.3 FARMERS SEVERELY AFFECTED BY HIV/AIDS

With more than 20 % of its population HIV positive, Lesotho is the country which has the highest rate of AIDS contamination. The problem became of greater importance in the 1980s, with the Highland Water Project which engendered a spread of the virus into the Highlands through numerous people and prostitutes working around the dam building programme. In spite of many efforts from the government to do information campaigns, many people in remote areas are ignorant about the virus and keep on claiming that “Men are pumpkins and should behave so, and women are cabbages and should behave so” (personal communication during a HIV campaign). That is to say that men should multiply their sexual partners whereas women should stay faithful. Officially, 15 % of the population in the Mokhotlong district is HIV positive (this data concerns only the few people who have tested for HIV).

The majority of men who worked in the mines or in the plantations died prematurely, notably from AIDS. However, the reason for the deaths are often unclear for the families, who just say that a “sickness” was the cause.

HIV/AIDS has severe consequences on a family's structure and farming activities. When one or both parents die or are sick, the lack of workforce for farming activities affects food production and
the intergeneration transmission of knowledge.

Another aspect of the infection concerns the diet; indeed a nutritional care for people living with HIV/AIDS is an important part of caring at all stages of the disease. However mountain farmers' diet is based on maize meal, beans, little meat and cabbages, which should be added with a daily consumption of fresh vegetables according to the World Health Organization and Food and Agriculture Organization (2002). PELUM and ESAFF are already involved in training the farmers about the importance of vegetable production.

3.4 Migrant labour as « a way life »

Basothos have for a long time been working in large numbers in the neighbouring Republic of South Africa with the result that migrant working has become a way of life. Migrant labour is an important source of work and income in Lesotho, and much of this wealth was invested in farming activities. Mainly the men are migrant and go for a while in RSA to bring money back home. In 1993, 60 % of the male working population was employed in RSA. In the rural areas their absence is of critical interest as part of the family workforce is missing for the field work.

Historically Basotho people have mainly worked in the mines but in the mid-1990s, there was an important retrenchment of the migrant workers: with the end of apartheid, the South African Government wanted to fight against unemployment and favoured national workers rather than foreigners. Since many households were relying on that source of income, the men kept on going to RSA to look for jobs. Nowadays, thanks to the road from the study area to the Sani Pass, a border post, they have an easy access to the state of Kwazulu Natal and work in the sugar cane plantations.

Nevertheless, whereas the work in the mines was totally organized by the government through a National Recruitment Centre in Mokhotlong, now men are on their own to seek a job and pay for the transport and the accommodation, thus providing just a little share of their income for the family. Thus migrant labour hardly contributes to the improvement of the mountain farmers' livelihood, all the more as it deprives the family of part of the workforce.

3.5 An economy integrated in the Southern region of Africa:

When Lesotho became independent in 1966, the country was already highly populated, with a population of 2 million for only about 30,000 ha of arable land. It means 1,5 ares of arable land per person. For more than a century it has been dependant on South Africa for labour and for finished products and foodstuffs.

Indeed, South African agriculture is based on large-scale farming which utilizes economies of scale: the country produces high volumes of food, using high external inputs means, has a good infrastructure and agriculture support system and produces surplus easily exported to Lesotho. Thus, the goods from the neighbour are cheaper.

This dependence has been enhanced by the creation of the Southern African Custom Union (SACU) in 1910 during the colonial period. This union is an economic integration arrangement between South Africa and Botswana, Lesotho, Swaziland, and Namibia (so-called the BLNS-countries): it is a system of free trade behind a common external tariff. One of the SACU objectives consists in the sharing of “equitable benefits arising from trade”. Nevertheless as South Africa is the most populous and largest of the member countries, this union has proven to be quite unfair to the other countries (Kumar 1988, 1992). As a result, BLNS-countries receive a compensatory payment from SACU, “to counteract the disadvantage of being a member in a custom union with a much more developed country (RSA), such as diminished fiscal discretion and a diminished potential for development”. Lesotho is highly dependent on that payment since it constitutes 50 % of the
country's generated revenues (Peasley, 1989).

Lesotho is also part of Southern African Development Community (SADC), with Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe. The principal aim of the community was to reduce the dependence of the Southern Africa region on the outside world, especially South Africa, and to promote and coordinate regional cooperation in development projects. The RSA joined it in 1990 after the end of apartheid and is now leading the decision process (Omer-Cooper, 1987).

Owing to these partnerships and the geographic situation, Lesotho is totally dependent on South Africa: all the imports or exports pass through RSA. Moreover, South Africa exports without any tariff charge manufactured products to Lesotho, thus undermining the industrial development in the country, and especially the wool and mohair industry.

- **The economic partnership with the European Union**

Since January 2008, Interim Economical Partnership Agreements (IEPA) have been discussed with the European Union (EU). Those agreements are the successor to the Cotonou Agreements (passed in 1975, with the Lome Convention), which were to allow African-Caribbean-Pacific (ACP) countries to export their products without tariff charges to their ancient colonies. However, this agreement did not follow the World Trade Organization laws against non-reciprocal trading preference and had to be cancelled.

The IEPA is about a bilateral trade agreement between ACP and the EU with no tariff charge for either party. Lesotho has already signed this agreement, but South Africa not yet, even though it has been involved in the Trade Development Corporation Agreement (TDCA) with the EU since 1999, planning that in 2012, 83.6 % of the European products could enter RSA without tariff charge (Ubifrance et les missions économiques, 2008).

On the one hand, if South Africa does not sign the IEPA, Lesotho is going to have problems with the transportation of goods to and from the EU, because South Africa will take a tariff charge on the way. On the other hand, if South Africa agrees to this agreement, the EU is going to export many manufactured products to Lesotho without tariff charges. With either solution, Lesotho would have its national market invaded by foreign manufactured goods and its local food produce undercut in price.

4 **Matsoaing, a study area in the remote district of Mokhotlong**

The Mokhotlong district is in the highlands of Lesotho. It is located close to the state of Kwazulu-Natal in South Africa, easily accessible by the Sani Pass. The Matsoaing area is situated in the valley of Sehonghong, between the town of Mokhotlong (Latitude 29°08'00.00"S, Longitude 28°56'50.60"E, 2460 m.a.s.l) and the South African border (map 2). The study covers nine villages, which total an area of 15km², and in addition the surrounding pastures.
5 The field study hypothesis

Can the wool and mohair production be the spearhead of a sustainable development of the rural mountains of Lesotho?

On the one hand, it is a raw material produce entirely exported abroad, where all the added value is gained, to the detriment of the Basothos who buy the manufactured product: the famous Basotho blanket. On the other hand, the increase of the stock number has contributed to pasture deterioration, which severely compromises the sustainability of this production. That is the starting point of this study.

While the development of mountain people is a crucial issue, wool and mohair production could contribute to the improvement of their livelihood, hence the importance of having an overview of the commodity chain.

However, all are not livestock owners and some have become migrant workers. While migrant labour can hardly substitute for farming,

how can this mountain agriculture be remunerative in the context of the shortage of arable land?

Finally, in this remote area, what are the marketing opportunities?
1 Agriculture: a complex object of study

There is no relevant action that one can take, in terms of agricultural development, without a previous deep understanding at a regional scale, of both the agrarian system dynamics and the diversity of the farms (Cochet and Devienne, 2006). Hence the idea of the work is to provide a functional understanding of Matsoaing mountain farming for designing projects. The agrarian diagnosis aims at fulfilling such goals by highlighting and classifying the main issues for a small agricultural region.

Indeed « the definition of agriculture must move beyond the narrow view that focuses primarily on the development of practices or technologies designed to increase yields » (Francis, 2003). The concept of agrarian systems is a tool for understanding agriculture which is such a complex object of study. According to Hengten and Vissac (in Bonneval, 1993) the agrarian system can be defined as a combination of:

- the society,
- the environment,
- the agricultural practices implemented by a society in a certain environment in order to satisfy its needs.

The agrarian diagnosis is a field work which takes into account these three poles and their relationships. An aspect of the diagnosis consists in a fine description of the farms' structure and functioning, so as to draw hypotheses concerning the prospect of changes to farms, and the identification of the farmers' constraints. Thus it enables one to highlight the conditions in which farmers could and would change their agricultural practices. Such a work is facilitated by the recourse to a systemic approach which reveals the complexity of the farms' functioning. In addition to this it requires a multi-perspective analysis requiring a wide range of sciences amongst which agricultural sciences, economy and sociology.

The study is based on the postulate “Farmers have reasons to do what they do”: the agricultural practices are a central object of the study (Jouve, 1992) and the understanding of the reason why farmers are acting in such a way is of high importance. It is continuously influenced by a variety of factors, physical (notably climate, nature of soils, relief), biological (crops, livestock, weeds, pests, etc), social (social organisation), economic (outlets, profitability, amongst others), politic (notably agricultural policies, extension programmes).

Nevertheless the study of agriculture is not only the identification and technical description of the farming systems. Indeed the economic assessment is also essential as it helps to understand why in a small region there are different farming systems.

2 The agrarian diagnosis: a systemic approach taking into account the complexity of how a farm functions

2.1 A multi-perspective analysis from the field to the regional scale

The origin of the research on agrarian systems, which is named farming system research in English-speaking countries, is the setting up of development programmes which are well adapted to
the farmers' needs, more specifically to the disadvantaged ones. To reach these goals the study is based on a multi-perspective analysis from the field to the region (see \textit{table 1} below); each level reveals complementary information whose overview enables the full understanding of the agrarian system.

\textit{Table 1: The agrarian system approach}

<table>
<thead>
<tr>
<th>Level</th>
<th>Analysis unit</th>
<th>Studied</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Field</strong></td>
<td>a. Crop system*</td>
<td>a. Soils, micro-climate, crops, weeds/pests, agricultural land history, crop management sequence, agricultural calendar</td>
</tr>
<tr>
<td></td>
<td>b. Livestock farming system*</td>
<td>b. Also flock/herd, stock management pattern over time, feeding schedule, grazinglands management</td>
</tr>
<tr>
<td><strong>Farm</strong></td>
<td>Farming system*</td>
<td>Means and methods of production, work load, farm evolution pattern over time economic performance</td>
</tr>
<tr>
<td><strong>Village territory</strong></td>
<td>Agrarian system</td>
<td>Natural resources management, land tenure. Climate, vegetation, etc.</td>
</tr>
<tr>
<td><strong>Country/district</strong></td>
<td>access to markets Outlets</td>
<td>Macro-economy and politics in a local to international context, extension programmes</td>
</tr>
</tbody>
</table>

(*see text box 1 below)

\textbf{2.2 A SPECIFIC CONCEPT: THE FARMING SYSTEM}

The farming systems are part of global systems such as the agrarian system and the local society. It is a combination of sub-systems: the crop systems and the livestock farming systems (text box 1).

\textbf{Farming system:} a farming system, is defined as the combination between the land, the labour and the means of production for crop and livestock production, common to a group of farms. Rather than considering the farm as a sum of different production units and a sum of production techniques and means, it is considered as a whole, whose different units are organized and interacting in a complex way: these internal relations must be analysed and understood before studying deeply each unit. It is at this scale that all the decisions are taken. According to Pearson and Ison (In Bonneval, 1993) it is a group of interconnected activities that a farmer/farm family manages according to his/its objectives or projects, and according to the environmental, economic, technical and cultural constraints. The limits of the farming system are defined by the scope that the farmer is able to control.

\textbf{Crop system:} the concept of crop system is at the field/plot scale. It highlights the practices on fields/plots cultivated in the same way. It is determined by the crops' characteristics, their succession on the fields and the agricultural practices implemented on those different crops. Indeed, for a certain crop to be cultivated, agronomic conditions need to be fulfilled: the different ways of cropping are analysed (cropping calendar, tools used, time of work, reproduction of fertility). Furthermore, if those crops are cultivated, it is because farmers consider it as profitable; thus, the economic performance of the crop system is evaluated.

\textbf{Livestock farming system:} a livestock farming system is characterized by the interaction between the farmer, the stock and the natural resources. According to Landais (1987) it is a group of ...
elements in dynamic interaction, organized by the human so as to exploit resources through
domestic livestock in order to get animal produce or to answer to other needs. At the flock/herd
level, the livestock management practices (breeding, feeding schedule, grazing calendar, work
calendar) are analysed, and, as for the crop systems, the economic performance is evaluated.

Text box 1: Central concepts related to the agrarian system analysis

2.3 Interviews: the Keystone of the Study and a Broadening of Farmers’ Horizons

Interviews with farmers are the core of the process, to gather information as well as to initiate a
dialogue and enhance the awareness of farmers.

The interviews are semi-structured in order to allow an efficient collection of information,
quantitative as well as qualitative, subjective as well as objective. The comprehensive interviews
are first used to approach a wide range of issues and then, as the understanding of the issues is
bettered, the interviews target specific topics.

In order to promote farmer participatory research, a special care is given, at the beginning of
each interview, to explain the purpose of the study, the topic of the talk, and the reason why it is of
interest to collect such data so as to start enhancing the capacities of the mountain farmers of
Matsoaing. Then the team is ready to discuss the ins and the outs of the topic. At the end of each
interview time is taken with the farmer(s) to discuss about broader issues of the study.

Furthermore one tries to organise the interviews with several farmers at the same time, to
confront the interviewee's point of view.

The results of each interview are analysed and discussed during the same day in order to be able
to target the main points to deal with the following day.

A guide to interviewing is built. This document appears in appendix 2.

2.4 The Organization of the Field Study

A detailed calendar of activities of the study is developed in appendix 1 and the programme of
interviews in appendix 3.

2.4.1 Prior to Departure, and at the Arrival

Some literature review is done prior to the departure concerning general information about the
context: the climate, the political and economic situation of Lesotho and the main agricultural
productions.

Once in the study area first priority is given to meet with the traditional authorities to introduce
the researches, PELUM association and the planning of the study.

2.4.2 A Study Area Located in the Rural Mountains of Lesotho:

The study area is chosen by PELUM-Lesotho to be in the Highlands. The Matsoaing area is
selected because of accommodation facilities available in the extended family of the chairperson of
the organization. Indeed, the accommodation is located in the study area so as to have a total
immersion in the local society and to acquire a deeper understanding of the farmers' reality through
a shared daily life of the valley that facilitates the dialogue with farmers. It also avoids wasting time
with transport to the research area.
2.4.3 A WORK IN BINOME AND THE PRECIOUS HELP OF AN INTERPRETER FROM THE VALLEY:

The agrarian diagnosis is done as a duo of researchers, a male and a female. Thus, the perceptions of the reality is complementary: the gender issue is an important issue and the reality is not perceived in the same way by a male or a female. Farmers may also react differently to an interviewer male or female. Furthermore, a deeper analysis can be done by dividing the work load between the two and considering both points of view. Questions during the interview are asked by both parties to let the different perceptions flow lead to different issues.

The national language of Lesotho is Sesotho, and in the rural areas, only a small part of the population can speak English. For that reason, all the interviews and the field study are done with an interpreter native to the Matsoaing area and translated into English. The interpreter is involved in each step of the study and works as part of the team every day. His role is to facilitate the contact with the farmers of the valley, to translate, to be part of the analysis of the results, and to refine the understanding of the Basotho culture.

2.5 THE AGRARIAN DIAGNOSIS, AN ITERATIVE PROCESS IN FOUR STEPS

2.5.1 STEP 1- THE LANDSCAPE INTERPRETATION: A KEY ENTRY INTO THE AGRARIAN SYSTEM

The first step, once in the study area is to understand how the territory is organized. «The landscape is the mirror of the current and ancient relation between the humans and their environment» (Lizet, de Ravigan, 1987, p14). Following the method developed by INRA researchers (Lizet, de Ravignan, 1987) the landscape interpretation is achieved by walking round the area, including the farthest pastures. The collected information appears in table 2.

Table 2: Guidelines for the type of information collected during the observation of the landscape

<table>
<thead>
<tr>
<th>Topography</th>
<th>Land development</th>
</tr>
</thead>
<tbody>
<tr>
<td>- altitude</td>
<td>- shape and size of the fields</td>
</tr>
<tr>
<td>- shape of the relief</td>
<td>- crops and their location</td>
</tr>
<tr>
<td>- slope</td>
<td>- use of the grasslands</td>
</tr>
<tr>
<td>Geology-Pedology</td>
<td>- settlement: type of houses, organization, etc.</td>
</tr>
<tr>
<td>- type of bedrock</td>
<td>- infrastructure: roads, school, shops, etc.</td>
</tr>
<tr>
<td>- soil survey: depth, structure, texture</td>
<td></td>
</tr>
<tr>
<td>- erosion phenomenon</td>
<td></td>
</tr>
<tr>
<td>Spontaneous vegetation</td>
<td>Families and farm</td>
</tr>
<tr>
<td>- characteristics: species, density, location</td>
<td>- production tools</td>
</tr>
<tr>
<td>- consequences of human activity</td>
<td>- livestock: species, function</td>
</tr>
</tbody>
</table>

In the mountain areas, the variation of elevation engenders the maximum of biodiversity. So the landscape is covered from the higher elevation to the lower part down in the valley. The interpreter helps to understand the perception that farmers have of their environment. Moreover, since it is difficult to determinate the extent of areas for pastoralism, the interpreter can bring precious information. Before visiting farmers and let them talk about their reality, observing the landscape gives essential information about the dynamics in action. From those observations various questions and hypotheses arise about how the landscape is used; which is later confirmed or not during the interviews with farmers.
Furthermore, to mark off the study area is part of this analysis. The size is a compromise between the means of transport (by foot) and the embracing of the different agro-ecological zones used by the farmers of the valley.

2.5.2 Step 2 - The agrarian history: essential to comprehend the local stakes of rural development

The landscape is not “static”: time is an important dimension. In order to give perspectives of the evolution to the agrarian system, the current dynamics, consequence of an age-old agrarian evolution, must be defined. The next step is to understand the agrarian history of the study area: understanding what is happening nowadays by questioning what happened and what were the dynamics during the last century. In that way, it is possible to understand how farming systems have evolved, what have been the main causes of changes, and it allows to break with the often quoted fatalism concerning one's situation. It can then be explained how farmers adapt to face the constraints, and hypotheses can be drawn about what could be the future. This information is collected from individuals and elders groups: group interviews permit an understanding of the history of the valley, and individual interviews permit an understanding of the personal history and farm trajectory.

Furthermore, secondary data is found through literature review at the National University of Lesotho (NUL) and Institute of Southern African Studies (ISAS) to complement primary data.

At the end of this phase, it is possible to identify a pre-typology of the farming systems in the valley resulting from the history. Although there is a temptation to take into account all the diversity observed in the farming practices, the functional typology helps to have an overview of all the different strategies observed in the Matsoaing area. The typology is linked with the aim of the development project: improving the livelihoods of the rural population with a focus on the more vulnerable. As a result, the criteria used to build the typology are not only the farming practices but also the level of capitalization, and the reliance on off-farm activities.

For the understanding of the dynamics in the valley, it is interesting to take a census of the households of six villages (140 households), their possessions (fields, animals) and the activity of the head, in the Matsoaing area. Indeed, it seems that there is a link between the generation, the place of living and the kind of activity of the household's members. The census is done with the headmen of the villages. It permits one to be more efficient for the understanding of the dynamics, to understand the social organization and to facilitate the interviews about the farming systems (to identify who to visit and to avoid mistakes or lapses).

2.5.3 Step 3 – Investigating the farming systems

Each type of farming system identified is investigated. For both crop and livestock production a special care is given to identify the reason for each practice, the right time to implement it and its duration so as to build cropping and agricultural calendars. To assess the agronomic performances, the study is at the field and the flock/herd level. The data are compiled so as to reveal the transfer of labour and material between crop and livestock farming systems.

A sample of several farmers, about four for each farming system, is interviewed to build a cross-section.

The final typology comes afterwards, once a clear vision of the situation appears. Last but not least the transfer of labour and tools between the different farming systems is highlighted; thus a global view of the agrarian system can emerge.
**2.5.4 Step 4 - Which Economic Performances?**

An economic assessment is done so as to highlight the sustainability of each farming system. It consists firstly in assessing the income of each system, and secondly in comparing it with the survival threshold. One can assume that if the wealth generated by the farming systems identified enables them to cover the basic need then it is sustainable; if not these farmers are in danger as they could not maintain the means of production. This method is quite imprecise, nevertheless the aim of this assessment is to identify the trends: it is better to be approximatively right than precisely wrong.

Practically the income per active farm worker is calculated for each farming system, calculating the value of all the produce consumed by the family or sold. An average of three farmers are interviewed per type of farming system so as to get an average income. Moreover, off-farm activity incomes are estimated by comparing the situation of different families of a certain type of farming system, which helps to highlight the importance of that off-farm income for the households.

The survival threshold is determined thanks to the method used by Ferraton et al (Agridoc, 2003): a list of basic needs (food, clothes and manufactured goods) per standard family (field data, see appendix 12) is established to evaluate the minimum income required for the rural people of Matsoaing. Another method, implemented by the government of Lesotho (National Budget Survey, 2006) is more precise as it is based on the calculation of the calories required per person. Nevertheless because the composition of the food basket proposed by the government is not relevant for that area due to its remoteness, the method of Ferraton is used (see appendix 12).

**2.6 A Two Level Work: Building a Tool for Project Designing and Initiating a Dialogue with the Beneficiary Population**

The study is conducted in a way that enhances capacity of farmers through a cognitive process of their situation leading them to express their needs and ultimately stand for them. This is in line with PELUM-Lesotho's intervention who strengthens local capacities process to ensure the sustainability and efficiency of development projects.

- **Innovative practices to stimulate change**
  - An article about the farmers of Lesotho
    
    In parallel with the study, an article about what is family farming is written both in English and in Sesotho to make the farmers of Matsoaing aware of the characteristics of their agriculture and how they contribute to the wealth of the country. The article is printed and distributed in all the villages. A copy of this article in English is in appendix 19.

    - Public gathering with the staff of PELUM-Lesotho

    Meetings with PELUM's staff are organized twice, in May and in July, to discuss the expectations of the organization and the present results. Moreover, a mid-term review of the field study in the Matsoaing area by the coordinator of PELUM-Lesotho allows to refine the feed-backs: three meetings are organized in different villages for the farmers to have an open discussion about the issues of the project. This is crucial because the population of Matsoaing is not used to the presence of governmental and non-governmental organizations.

    - Drawing, more powerful than writing or talking (GRAAP, p97)

Part of the population does not know how to read and write and does not understand English. For those reasons the de-briefing is done in the Matsoaing area in Sesotho by the interpreter. The purpose is to inform the farmers about the results of the study, do a transfer of knowledge, and discuss the prospects. In addition to this, posters consisting of drawings rather than text, illustrate
the main issues. This is crucial to create information accessible to all.

3 To complete the field study, an analysis of the access to markets: a key issue for the mountain people

During a workshop about mountain people in Southern Africa, organized in Lesotho by ESAFF, GRET, PELUM-Lesotho and WMPA (October 2006), it was stated that mountain people have an « inadequate access to markets ». Indeed, the remoteness of rural mountain areas is often linked with a poor access to markets.

But the agrarian system is involved in a broader economic context: to identify how farmers access markets and how the agrarian dynamics are linked with the marketing opportunities gives a broader view of the agriculture in the study area.

To better understand the economy, the result focuses on:
- Markets and actors' strategy
- Producer-consumer chain
- Produce processing
  - The wool and mohair distribution channels analysis

Because wool and mohair are the main cash income-generating productions, a brief analysis of the distribution channel appears to be fundamental. The aim is to know the economic situation in this rural market place.

Literature review at NUL is done to understand the history and evolution of the wool and mohair marketing system. Furthermore, farmers are interviewed to understand what are their opportunities and strategies to sell their produce as well as the importance of that production to their total incomes; on the other hand, interviews with officials of the Ministry of Agriculture and Ministry of Trade and Marketing (Department of Livestock) can be done in Maseru and Mokhotlong to highlight the government's role in the wool and mohair commodity chain and its improvement. It also allows to reach information about the quality of the produce in the Matsoaing area. The private trader of Mokhotlong is visited to compare the two marketing opportunities offered to wool and mohair growers.

Both the interviews and the literature review are done so as to answer broad questions that are presented in table 3.

Table 3: Practical analysis of a market place through five angles (from Lassalle, 1999)

<table>
<thead>
<tr>
<th>Where is it?</th>
<th>farm gate, local, regional, national, international</th>
</tr>
</thead>
<tbody>
<tr>
<td>To answer this question aims at locating the market in the space.</td>
<td></td>
</tr>
<tr>
<td>When is it?</td>
<td>everyday, once a week, every season…</td>
</tr>
<tr>
<td>To answer this question aims at locating the market in time.</td>
<td></td>
</tr>
<tr>
<td>Who is concerned?</td>
<td>producers, collectors, co-operatives, traders, state</td>
</tr>
<tr>
<td>To answer this question aims at identifying the actors</td>
<td></td>
</tr>
<tr>
<td>What is concerned?</td>
<td>raw materials, processed products</td>
</tr>
<tr>
<td>To answer this question aims at identifying the products dealt</td>
<td></td>
</tr>
<tr>
<td>How are the prices?</td>
<td>fixed price, deal, contract</td>
</tr>
<tr>
<td>To answer this question aims at identifying the transaction procedures.</td>
<td></td>
</tr>
</tbody>
</table>
ON THE ROOF OF SOUTHERN AFRICA: A BINDING ENVIRONMENT

1 A high basaltic massif

The study area is situated in the ecological zone of the Highlands which occupies three quarter of the country in the eastern part. It is formed by the highest remnants of flat-lying basalt lavas which pierced the Karroo plateau during the Jurassic period (sketch 1).

In this formation the Senqu river and its tributaries have dug a mountain massif reaching 3,482m in the Thabana Ntlenyana, the highest mountain in Southern Africa. This river together with an extensive network of mountain wetlands forms an important part of the Southern African region's water resources.

The eastern and southern boundaries of Lesotho follow the high mountain watershed of the Drakensberg and it is for much of its distance the Continental Divide between the Atlantic and the Indian Oceans.

2 A climate shortening the crop growing season

The climate of Lesotho is influenced by of both Indian and Atlantic Oceans, which have a wide difference of temperature causing significant air flows and a continental temperate climate with four clearly identifiable seasons.

The western side of the Maluti mountains of Lesotho receives more than 500 mm rainfall per annum. Despite the high altitude, the mean annual precipitation declines towards the centre of the Drakensberg Massif due to rain-shadow effect. This leaves the interior of Lesotho relatively dry. Most of the rain falls between October and March and can occur as heavy torrents. Snow can be expected from May to September, and the amount received increases with altitude (Mokuku, 1991). While sunlight is not a limiting factor, water supply, together with the risk of frost and hail, and the coldness and moistness of the climate engender a short growing season (National report on climate change, 2000).

Mokhotlong is one of the coldest districts of Lesotho (see diagram 1), with frost from March to August. The crop season stretches from September to the end of April (8 months). Low temperatures seriously affect maize production, as the crop life cycle can reach 7 to 8 months.
Strong winds occur regularly in the highlands of Lesotho. In spring, the prevailing direction is South-East, becoming increasingly easterly in the summer months. These winds are associated with summer rain. In autumn wind blows mainly from the east while in winter the prevailing direction is from the West.

3 Matsoaing area, part of the mountain watershed of Sehonghong

The Sehonghong watershed has been formed by the Sehonghong river and its tributaries, flowing from the South-East toward the North-West. The Matsoaing study area, which is part of the 20-kilometre long Sehonghong valley, is 5-kilometres long and ranges from 2,000 m.a.s.l up to 3,000 m.a.s.l. The slopes range from 5,7 to 40 % (Chakela, 1989).

Groundwater resources occur at all levels where pockets and layers of weathered basalts make contact with unweathered basalts (Schmitz and Rooyani, 1987). It forms springlines that are mainly located in the upper part of the slopes, while temporary streams flow toward the Sehonghong river forming an undulating topography. Water availability has certainly been of crucial importance for the location of the villages. On the high Sani plateau small bogs with a diameter of up a hundred metres are used for animal watering.

Both slopes of the valley are marked with a prominent rock line, at 2,500 m.a.s.l, showing two storeys. Up to that line, the slope is steeper than above; this area is called Matsoaing (divided in two sub-areas: the slopes, Letsoapong (“steep slope” in Sesotho), and Nokeng (“river” in Sesotho). The two slopes are asymmetric: the south facing slope on the whole is steeper than the north facing slope and receives less sunlight.

The Sehonghong valley presents an altitudinal zoning constituting a sequence of steep slopes and planation surfaces as shown in sketch 2.

Diagram 1: Temperature and rainfall diagram in Mokhotlong (Courtesy Lesotho Meteorological Services)
An eroded steep slope area

Matsoaing is a steep basaltic slopes area. The upper slopes consist mostly of bare rock surfaces. Further down, a heap of rock fragments and stony soils appears, and at the foot of the slope deeper soils occur. The material on the upper slopes is rapidly eroded, while further downslope, accumulation dominates, and this is reflected in the increasing thickness of the top soil horizon. Soil erosion takes the form of rills and cattle steps and the superficial soil cover is in many instances severely damaged.

Plane slope areas

Planation surfaces, partly determined by outcrops and small cliffs at their base, occurs at two distinct elevations forming spurs. These planed surfaces, cut in bedrock, are covered by unconsolidated materials, mostly loam. Near the mountainside they are mostly covered by a mantle of colluvium, which was derived from the higher and steeper slope above. But the planation surfaces carry little or no soil cover. The rims of these surfaces are often bare. Agricultural activity varies on both of the planation surface due to the different climatic conditions. At the higher surface area the temperature is 3 to 5°C colder.

A little floodplain

The floodplain is little developed and occupies narrow stretches along the Sehonghong river. The stream bed is cut in bedrock and along it an accumulation terrace has been formed. The terrace consists of both alluvial deposits of different size and colluvium, which are less than 2 metres deep. Provided that pebbles are removed from the soil it is suitable for crop production. Part of the floodplain is yearly overflowed during the crop season, which has created an eroded terrace not suitable for planting. Besides the altitudinal zoning, both slopes are asymmetric due to geological events. In Jurassic era drainage reorientation has occurred when the offshore Orange basin was formed. Later in the Cretaceous the continental separation between Africa and South America has pursued the remodeling of the landscape. The consequence is a barbed drainage patterns of south-flowing streams, and asymmetric northward shifting divides (Schmitz and Rooyani, 1987). The south facing slope is steep and is mainly used as a grazing area while the north slope is softer and has been put under cultivation.

4 Soils and agricultural potential: a great influence of topography, low temperature and agricultural practices

Because of high variations in slope and altitude, topography has played an important role in the formation of soil. The principal role of topography is its direct controlling influence on the erosion and deposition processes (Schmitz and Rooyani, 1987). On steep slopes, soil development is
weakened because of the great influence of erosion and low temperatures which lead to formation of immature soils.

Basaltic bedrock is the parent material and generates black mountain soils both in the valley and on the slopes. The properties of black soils reflect the influence of the basic basaltic parent material: neutral reaction, high base status.

### 4.1 A HIGH ERODABILITY ONCE UNDER CULTIVATION

The soils are shallow to moderately deep (<2 m) on the steep and middle slope. Basaltic colluvium and alluvium are the parent material for the deeper soils of the valley. Above 2.900 m.a.s.l soil formation is almost nil and basalt rock land dominates.

When grass cover is not removed a well defined mollic epipedon is present. It has dark to black colour and a high organic matter content, a granular structure and a high level of base saturation. Once put under cultivation, the organic matter content rapidly falls and the soil loses its structure.

Matsoaing shows two patterns of soil systems. At the higher elevation up to 2.500 m.a.s.l, low temperatures slow down soil formation mechanisms. The soils are immature, well structured, dark brown to black, of 1m or less depth, and are less eroded.

Below 2.500 m.a.s.l higher temperatures allow further pedogenetic development. Soils have proven to be deeper downslope because of soil components migration from above. In addition to this, clays have been leached into the sloping soil and have migrated into the soils of the valley floor. Thus, the slope soils are silt textured and tend to be clayey-loamy down slope. Thanks to it, valley floor soils are of higher agricultural potential because clay and organic matter together can provide for a better structure, and for a higher capacity for holding nutrients and water.

In brief the main limitations for cropping are shallowness, slope, low temperature and erodability.

### 4.2 CONTOUR FARMING: AN EFFECTIVE BUT INSUFFICIENT MEASURE

The effect of vegetation cover removal, or the reduction of its density for cultivation and grazing are important factors in the acceleration of soil erosion. The resultant features of erosion are cattle steps, rills and bare rock surfaces. Continuous cropping of row crops, mainly maize, has lowered the soil fertility; and grazing of crop residues after harvest worsens the maintenance of a good organic matter level in the soil. The cropping period should be followed by a resting period under grass, but according to Leduka (1998) fallows are only done due to poverty (sickness, no seeds or no money) rather than for agronomic reasons. These agricultural practices do not only cause a gradual decrease in crop yield, but also increase soil erodability. Livestock overgrazing on patches of land and tracks, particularly around the villages becomes the centre for concentrated runoff. Accelerated erosion is a result of overgrazing.

Both the practice of contour farming and the building of contour banks in the farmlands date back to the 1930s. Terracing is generally an effective conservation measure. However the key to an effective terracing system is the frequent repairing and maintenance of both the channels and the ridges of the terraces. Unfortunately it is common to find broken contour banks.

### 5 A vegetation mainly herbaceous forming wide pastures

Afro-alpine plant communities occur in the highest mountains of Africa. In Southern Africa, these communities occur only in South Africa and Lesotho. There is no natural tree growth (Mokuku, 1991).
Lesotho is predominantly a climax grassland. Shrubs co-dominate at higher elevations. *Themeda triandra sourveld* (Seboku sourveld) is dominant on the valley floor and down slope of Matsoaing. Seboku is the most palatable species of the Maluti's grasslands.

At higher elevation, a mixed sourveld of *Themeda t.* and *Festuca caprina* is predominant (Letsiri sourveld). An indigenous species *Merxmuelleria drakensbergensis*, a densely tufted grass (commonly burned because it is not palatable when old) is scattered among the grass cover. *Helichrysum odoratissimum* and *Hyparrhenia dregeana* are commonly found above 2,500 m.a.s.l. High altitude slopes around 3,000 m.a.s.l have a climax of *Erica helichrysum* heath (the different vegetation storeys are shown in the table 4).

Shrubland species are also found on grasslands: *Sehalahala* (Chrysocoma tenuifolia) and *Leucosidea sericea*, are encroaching the velds.

**Table 4: Vegetation storeys of Matsoaing area**

<table>
<thead>
<tr>
<th>Ecological zone</th>
<th>Elevation range (m.a.s.l)</th>
<th>Vegetation type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mountain valley</td>
<td>2.000-2.500</td>
<td>Seboku sourveld</td>
</tr>
<tr>
<td>Mountain slopes and high</td>
<td>2.400-2.900</td>
<td>Letsiri sourveld</td>
</tr>
<tr>
<td>Summital area</td>
<td>2.800-...</td>
<td>Mixed heath/Letsiri sourveld</td>
</tr>
</tbody>
</table>

- The encroachment of unpalatable species threaten the pasture quality:

Although Seboku and Letsiri are the dominant species, a great proportion of the Matsoaing pasture is now composed of Sehalahala, an unpalatable shrub only consumed by the goats. Pasture degradation and the encroachment of Sehalahala (Chrysocoma tenuifolia) have been observed since the beginning of the 20th century.

### 6 Wood, a scarce resource

Since fuelwood resources are scarce, the main vegetal sources of fuel for cooking and heating are *Chrysocoma tenuifolia* and *Leucosidea sericea*, two semi-woody shrubs collected far up on the mountain slopes and plateaux. Cow dung is also a source of fuel, and is collected in the kraal or along the paths and fields and dried.

Exogenous trees are planted on private land along the river and the streams (*Populus canescens*, small grey poplar trees, and *Salix capensis*, willow trees), and are used for wood production. They are notably used as building material as well as to build the ox-sledges\(^2\).

Peach trees (*Prunus persica*) are planted close to the houses. All those trees have notably been provided originally by the British colonial administration in the 1930s. After Independence it became a mandate of the Ministry of Forestry and Land Reclamation: poplar tree and willow tree plantations are planted to fight against wood shortage and land erosion. And peach trees enable farmers to improve both diet and income. The trees were originally the chief's property and were later allocated to the farmers whose fields bordered them. Since the 1960s, anybody can acquire trees individually and for free from the Forestry Department; nevertheless there are only a few trees due to the poor extension campaigns and the distance from the offices.

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1 Sourveld is a veld/pasture type and refers to the low palatability of the veld (particularly in winter). (Van Oudtshoorn, 2004)

2 The main means of carrying heavy loads such as the harvest, is a sledge made with firmly and roughly assembled wood branches and pulled by a team of oxen. One can wonder why carts, so common in the Lowlands, are absent. One reason is probably the dangerousness of such means of transport on steep slopes.
The only access by vehicle to the Matsoaing area is by a gravel road, which links the district headquarters Mokhotlong, the closest town at 20 kilometres, to Sani Pass, on the border with South Africa. The road, hardly practicable in harsh weather, follows the river before going up through high passes.
The Matsoaing area is referred to as a landscape of wide pastures where humans settled to develop small-scale farming. The valley is divided into three main units (sketch 3):

- villages, fields and surrounding grazing areas, at two different storeys: the lower planation surface between 2.250 and 2.450 m.a.s.l, and the upper one above 2500 m.a.s.l where the highest villages are. A prominent rock line separates the two storeys. This area of settlement occupies the lower part of the valley.
- winter pastures, farther upstream in the narrow part of the valley and gorges. This area stretches 20 km from the limit of the last villages to the high plateaux, and it ranges from 2.400 to 3.000 m.a.s.l,
- summer pastures, farther upstream where the mountains turn to a wide landscape (of approximatively 400 km²) of vast flats at 2.800 m.a.s.l, surrounded by 3.000 m.a.s.l summits.

The main settlement areas are close to water springs and permanent streams, on flat parts protected from the wind. The villages are located at the inflection point between the steep slope (where the closest grazing areas are) and the gently sloping part where the fields are: the houses constitute, for the animals (mainly cattle sheep and goats), a barrier between the pastures and the fields. As a result, the landscape was a mosaic of village areas, each of them constituted of homesteads, fields and surrounding village pastures. The first villages followed this scheme and used to be on the slope rather than close to the river.

Because of the cooler conditions at higher elevation, the farmers do not grow the same crops on both levels. The upper planation surface is dominated by wheat (*Triticum spp.*), which requires a moderately cool growing season. Downslope maize (*Zea mays*), a sun loving crop, is largely cultivated.

The valley is highly populated but settlements are only on the north facing slope: the south facing slope is too steep, colder and almost devoid of water springs. Walking paths criss cross the slope and link the different villages and households. The main means of transport are donkeys and horses and are mostly ridden by men.

**2 End of the 19th century: populating the Highlands**

**2.1 LEAVING THE OVERCROWDED LOWLANDS IN SEARCH OF ARABLE LAND AND GRAZINGLANDS**

The first settlement in the Matsoaing area took place in the latter 19th century where the current villages of Mathakheng, Matsoaing 1 and 2 and Makhapung stand. The new arrivals, only a few families, were the refugees of the time of *Lifaqane* (tribal wars before the creation of the Basotho nation) from the Eastern Cape, or were from the Mafeteng district in the Lowlands. Indeed, in the south-western part of Lesotho no more arable land was available for the new generation, and the chiefs were abusing power. For those reasons some families left and some chiefs sent their sons to create new areas of settlement in the Highlands. The Sehonghong valley was already well known by its recent settlers since the overcrowding of the Lowlands had led to transhumance in the mountains.

One can assume that there was a disparity between the first inhabitants: some already possessed capital in the form of hardy species of cattle, sheep and goats, whereas others had no possessions but the hope of a piece of land to make a living.

Nowadays is the sixth generation. Almost all the population of the area is the descendant of the first families. The population has not stopped increasing since the first settlement. Only few
newcomers have settled in because for newcomers there are more difficulties in becoming land
owners (Leduka, 1998). Moreover, only the sons inherit from their parents and stay in the valley,
whereas the daughters depart to live with their husband's families, who are most of the time from
another area.

2.2 THE EXTENDED FAMILY AS THE SETTLEMENT ORGANIZATION’S BASIS

The villages, or chiefdoms, are composed of a certain number of extended family units or
households which are the building block of the Sotho society (text box 2). It is traditionally
composed of the man, his wife, his unmarried daughters, his sons together with their wives and
children, and any other dependent. Each homestead consists of a certain number of roundavels, the
traditional round hut with thatched roof, according to the size and wealth of the family. Close to the
house stands the kraal, a rectangular stone-made enclosure, where animals are penned at night.
Makhapung and Matsoaing 1 are the most populated villages of the area with 36 homesteads each;
some consist of only a few.

A patriarchal society:
The society is based upon a pattern of rights and obligations both within and between various
extended family networks. Much of the work is accomplished by specific sex or age groups at
particular times. Women are engaged in agricultural activities and prepare food, while men herd
animals and build houses and kraals. Young girls begin to help their mother in raising smaller
children or in the household chores early, while boys help with the livestock. Men play a dominant
role in matters of ownership of goods and in the decision making process. Most of the family's
wealth in the form of livestock belongs to men (Gill et al. 1993).

Text box 2: Traditional social and labour organisation of the Sotho society

- The houses: roundavel or polata, an indication of the recourse to off-farm activities
  The roundavels are traditional houses which are made of stones taken from the ground (sketch
  4). The volcanic rocks found in the area have proven to be of high erodibility when bare: for that
  reason, the stones used as building material are extracted from the ground or are collected from
  the river, so as to avoid using weathered materials. Wheat stalks are used to build thatched
  rooves. The inside of the houses, both walls and floor, is plastered with a mix of mud and cow
  dung so as to prevent insects.

  A second kind of house dates back to the later 19th century, the polata, is a rectangular hut with
corrugated iron sheets on the roof, and sometimes made of concrete blocks (on the right, sketch
4). Those types of houses are a visible sign of the family's reliance on off-farm income and they
are more and more numerous. Indeed the polata have been/are built thanks to the remittances of
the household head as he is/was a migrant worker.

Sketch 4: Traditional homestead in the rural mountains
3 Only little space available for crop production

Little part of the landscape can be devoted to crop production, causing a high importance of livestock production to provide an income.

3.1 Field allocation: the constraints of the climate and of the slope

The organization of farming in Matsoaing reveals a two-level system (sketch 5): the lower one is the maize storey, whereas the upper one is the spring wheat storey. Though white maize is the main staple food crop, it cannot grow on the cold wheat storey, and there people have a wheat-based diet. Since the south facing slope is steeper and colder, no fields have been established there except on the foot slope. However, on the north facing slope, the upper fields in the wheat storey can reach 2,650 m.a.s.l.

The fields are located mainly down the slope and on the flattest parts, or on the bank of the river if there is neither overflowing nor too many stones. The allocation of the fields has remained on traditional land tenure (text box 3).

3.2 Terraces to fight against soil erosion

The fields in the maize storey are of a quarter of an hectare to an hectare, whereas the ones in the wheat storey often reach one hectare. Most of them are terraced, which forms narrow (3 to 8 m) and long parcels (up to 150 m) separated by contour banks. Some of the fields are overhung by a furrow, mainly in steeper places, to protect against run-off. These furrows are annually made with a plough. The only fields without furrows or contour banks are located on the flattest areas of the wheat storey.

Fields in the maize storey do not form a continuous set but are scattered along the slope. The uncultivated areas are steep, bare rock or grassland covered where creating new fields is forbidden. On the contrary, in the wheat storey fields form a continuous set: the slope is softer, the occurrence of bare rocks is low. The narrow and elongated shape of the fields fits a tillage by animal traction. Indeed, farmers have used oxen and have possessed ploughs since the 19th century (text box 3).

The main crops cultivated are first of all white maize, which would probably be the only crop if the climatic conditions would have enabled it (text box 3), wheat, beans (Phaseolus vulgaris) and peas (Pisum sativum).
Mutual aid to face the constraints of the climate

Both the harsh climatic conditions and the strenuousness of the work have contributed to the need for mutual aid. For example, threshing and winnowing of the wheat must be done in a short period of time to protect from climatic hazard, but these farming operations are time consuming. This represents an important constraint in cultivation by hand. Thus the Matsoaing mountain people have traditional types of mutual aid:

- **Letsema**: The farmer invites others to participate in his harvest of wheat. It enables rapid harvest, minimizing climatic hazards. The work is often done by women and young men. The owner provides everybody with traditional beer and gives a part of the harvest to each female worker.

- **Sepane**: Mutual aid for fieldwork. Some farmers group together and each of them participates with labour, tools or draught animals, according to what he possesses. They work in each other's fields in a row. Some groups have been formed since the grand-parents' times and are still occurring today with the grand-children.

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### The land tenure:

The customary laws of Lerotholi (King of Lesotho from 1891 to 1905) required that three fields should be allocated to each family in order to provide enough food, and that those three fields should be on different kinds of area to avoid climate hazards. Moreover, if a field is left as fallow more than 2 years, then it can be reallocated to another family.

### The primacy of maize:

Maize reached Southern Africa during the 18th century via the Portuguese in Mozambique (Casalis, 1861). The Basothos originally planted sorghum (which was the main staple food crop), pumpkins, beans, sweet reeds and other cereals, but because of the popularity of maize, they tended to decline (compared to the indigenous cereals, maize has a higher yielding potential, is seldom damaged by pest or diseases, and land preparation, weed control and harvesting and requires little labour (Acland, 1973)). Moreover, from the time Basothos migrated to the mountains, only the maize could grow up to 2,400 m.a.s.l and wheat beyond that.

### The « agrarian revolution » of the later 19th century:

The use of animal draught power and of the plough started in the later 19th century (Casalis, 1861) while the prosperity during the 1870s and the migrant remittances gave the means to buy those implements and the yokes. Furthermore, the South African demand for foodstuffs led the Basothos to increase the grain production: South African mines of Kimberley and of Witwatersrand opened and many Basothos were providing grain to feed the mine workers, or went to work there. Cultivators and harrows were introduced one century later, in the early 1980s.

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### Text box 3: The land tenure and the evolution of the crop production since the 19th century

#### 3.3 A CROP PRODUCTION SEVERELY AFFECTED BY WEEDS

In the maize storey the “Khakibush” (*Tagetes minuta*), most commonly called *Lechuchuta* in Sesotho, severely affects the yield. This plant develops a dense and continuous sward which undermines the maize growth. Moreover the shortness of its life cycle and its high seeding rate make this weed control difficult but crucial. In the wheat storey, the *Belete* or common wild oat (*Avena fatua L.*) invades the cultivated areas; however, unlike *Lechuchuta*, it is of high palatability.

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1 Introduced from Europe during the Anglo-Boer war and has now become a pest. The vernacular name comes from “khaki”, the colour of the uniforms of the British troops (Smith 1966).
and is grazed by animals during the common grazing1. Both of those weeds have proven uneasy to control, Van Odtshoorn (2004) noticed that the seeds of wild oat can survive up to nine years in the soil.

4 Pasture management and livestock production: cores of the income-generating activities

4.1 Surrounding the villages and the fields, a vast grazing area

- An organization of the territory in three main zones

The grazing areas are communal land, without any fence, and occupy the major part of the landscape. There are three main areas where animals graze (sketch 6).

- The closest one is around the villages, called Matsoaing (or pastures C, as it has recently been designated by the local authority) in reference to the name of the area, on the south facing slopes and around the villages and the fields. Overstocking has led to significant erosion: many rills have been formed and most of the soils are bare.

- Upstream are the winter pastures, commonly called Tekeseleng (or administratively called pastures B). The winter pastures start where the valley becomes narrow, from the mountain called Tekeseleng (hence the name), and stretches from 2.300 to 2.800 m.a.s.l.

- The farthest are summer pastures, and of the best quality, Matseng “place where there is plenty of water” in Sesotho (or pastures A). These grazing areas are located at higher altitudes (above 2.800 m.a.s.l) on high and windy plateaux. They are very cold and snowy during winter.

1 The common grazing is a right of use which makes it possible to feed freely one’s ruminants apart from its ground, notably in the fields once harvested.
4.2 Livestock farming: an essential activity, less and less accessible

Livestock is of crucial importance to the livelihood of the valley of Matsoaing and is of multi-purpose. All the animals are raised on communal grazinglands, which means that every farmer has a free access to the pastures. Horses are commonly seen as the main means of transport and donkeys are used to carry heavy loads, firewood or sometimes people. The cattle are adapted to extreme mountain weather and are for multi-purpose productions: cow dung, draught power, milk, meat, or leather. In addition to this the Basothos raise wool sheep and mohair goats. The livestock is also used as a form of savings in the absence of micro-finance facilities: whenever the family needs cash, one animal is sold.

4.2.1 “Whoever possesses no cattle has no means for existence”

This sentence, taken out of an early description of the Basothos in the former 19th century (Casalis, p.153, 1861), already highlighted the importance of bovine animals. Indeed cattle contribute to most of the Basothos' needs and customs. In the remote mountain areas farmers rely on animal traction, not only to till the fields but to carry on the harvest back home. Also contrary to goats' milk, cow milk is consumed fresh with papa1 for breakfast. In addition to this cattle provide the mountain people with cow dung which is the main source of fuel in the absence of wood. Thus cattle ownership has remained a priority in the Maloti.

Considering the multi-purpose of cattle, two projects have been implemented under the authority of the Ministry of Agriculture for the last decades: the development of milk production and the breeding of draught power animals with the introduction of two species, the Jersey and the Brown Swiss. However those project have had little impact in Matsoaing area and only a few farmers have bought Brown Swiss bulls to breed their Sotho cattle.

In addition to this, cattle are involved in numerous Sotho society cultural features. For example a son will not milk the cattle before taking the animals to graze so as to express to his parents that he would like to get married, which Bereng (1987) named « breaking the milk pot ».

4.2.2 Wool and Mohair production: the main cash income-generating activity

The sheep and goats are mainly Merino sheep (Ovie aries) and Angora goats (Capra hircus angorensis) and are raised to produce wool and mohair: protein fibres derived from specialized skin cells, respectively of sheep and goats, used for textile production.

According to Ryder and Stephenson (1968) Merino's wool production dates back to the beginning of the 19th century on the surrounding plateau of the Karroo in South Africa. One can assume that Merino sheep keeping in Lesotho started at that period; the same authors noticed that Angora goats were introduced later, in the mid 19th century.

In the Matsoaing remote area, wool and mohair are almost the only source of cash income, making sheep and goats an important element of the farming systems. Sheep are more numerous than goats: indeed, Basotho people prefer mutton meat, it provides higher income and goats are more sensitive to the cold.

4.2.2.1 1870s, a privilege of few families

The Basothos have been raising sheep and goats for more than 150 years. When Lesotho engaged into a market oriented economy, wool, mohair and grain were the main produce that could be traded with South Africa. Since the high plateaux of Lesotho were inappropriate to intensive crop production, an optimum use of pastures was made. From the 1850s, the Basothos started to

1 Cooked white maize meal, stiff porridge
improve the wool and mohair quality by acquiring Merino sheep and Angora goats from South Africa.

A system of livestock loan, the *mafisa*, was then existing for everybody to benefit from the animal produce, especially the draught power and the cow dung, but the progeny belonged to the owner. This practice was from big livestock owners to small owners or to farmers who did not own animals. However, one can assume that the loan of sheep and goats rarely occurred: because the main purpose of this production was the cash income from wool and mohair, that the owners would not want to lose.

When people settled in the Sehonghong valley in the 1870s, only a few families owned animals: they were mainly the chief's property. But the trade with South Africa gave the means and the opportunities to more individuals to buy animals. At that time, the ratio for cattle, goats and sheep was 1, 2 and 3 and wool and mohair were already the main source of income (Gill *et al.*, 1986): this produce were sold at any time of the year to private traders in Lesotho who then were selling it to South Africa.

- **The animals' feeding management: a two-level grazing system**

In the early 20th century, the pastures were only divided into two areas: the village pastures (each village had its own grazing area) and the farther summer pastures (nowadays called summer “A” pastures), *Tekeseleng* being just on the way between those two areas. All the animals of the village were grouped together and taken to graze around the villages by a few members of the community. During summer time the animals transhumed to “A” pastures and were taken back to the village for the common grazing in autumn. Only the oxen stayed in the village during summer to till the fields. However small and private animal units stayed all year long around the village, and it was the owners' children who took care of the animals, while the father was busy working in the field or in contracts in the mines. All year long the animals were penned at night in the kraal to collect the cow dung, to prevent thefts, and also to protect the crops.

4.2.2.2 **Beginning of the 20th century: rise in the number of stock and owners and improvement in quality**

Between the 1860s and the 1920s, the number of Angora and Merinos increased dramatically thanks to good market opportunities for wool and mohair at the end of the 1890s and after the First World War or because migrant workers, whose number was increasing, were investing their income in small stock. More and more families started to have their own flock and herd. So, by the end of the 1920s, there was the highest rate of small ruminants ever seen.

- **A traditional practice to manage the grazinglands**

The traditional authorities, seeing the spectre of a new overstocking around the villages, enforced in 1939 the *maboella* traditional law. In 1850s, this law ruled the management of the grazing areas in the Lowlands; it consisted in setting aside a grazing free area for the regeneration of grass. This precaution should allow grass availability all year round. In addition to this Peasley (1989) said there was a seasonal migration in summer from the Lowlands to mountain pastures. This law is still operating for the grazing areas that surround the villages. In winter part of the pastures are preserved for the following summer grazing.

In parallel the government focused on improving wool and mohair quality: it imported pure bred rams available at cost and imposed a summary castration of cross-bred animals by livestock officers (Hunter, 1987). But only the wealthiest families invested in improved rams and billy goats to upgrade their hardy animals, and the animals started to be individually managed: a herd-boy was 1.

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1 In 1921 there were 1.85 million of sheep and 0.89 million of goats (Taylor, 1935). In 2003, there was 1.052.000 sheep and 800.000 goats in Lesotho (Ministry of Finance and Development, 2003).
hired to take care of each flock, one of his tasks was to avoid the mating of the improved animals with the cross-bred ones.

Moreover some livestock owners were discouraged from investing in improved animals, fearing stock theft. They started to shear the animals twice a year so as to avoid both the loss of the animals and to gain the income from wool and mohair. Also, the livestock was kept near the villages: as a result, the pastures around the villages severely deteriorated.

Such a management of both animals and pastures has engendered a decline in wool and mohair quality. Due to the importance of animals fibres, as it was the main wealth of the country, the government urged the buyers to be more discriminating on quality through prices, and in 1927 the importation of cross-bred animals was prohibited.

4.2.2.3 1930s: Scab and economical crisis decimate the stock

Since the beginning of the 1920s, the infectious scab disease, Blue Tongue and Quarter Evil had been spreading all over the country and infecting sheep and goats. In addition, the 1929 Slump in the United States provoked a sudden fall of the wool and mohair prices.

Then, several years of drought occurred between 1931 and 1937 and obliged people to slaughter many, if not all their animals to compensate for low grain production. After this episode, the number of sheep and goats had declined by 66 % but then started to increase again. The castration of the cross-bred animals became common and a dip tank building programme was implemented to fight against infectious diseases (Hunter, 1987).

4.2.2.4 1940-1970s: stock reconstitution and grazinglands deterioration

The income of migrant workers has mainly been invested into livestock (cattle, sheep and goats). Thus, the number of animals increased dramatically till the capacity of the grazinglands was exceeded. In parallel, the number of fields had increased and thus the size of village pastures was reducing. For these reasons the grazinglands were deteriorating, thus hampering the sustainability of that production.

4.2.2.5 1966-present time, post-Independence: extension and marketing organization, a national priority

The unpopular restrictive policies for the improvement of the fibre quality were abandoned from the mid-1950s as a consequence of increased participation of the Basotho people in government decision making. It evolved to a legislation against keeping cross-bred animals: local chiefs were asked to advise farmers (Hunter, 1987). Livestock owners were regularly advised on improvement by the Ministry of Marketing (Livestock Department).

After Independence, the Government of Lesotho organized the wool and mohair marketing system in order to increase its income and to favour farmers rather than traders. Soon, the Wool and Mohair Grower Associations (WMGA) were created to organize the shearing, the marketing and the transport of the clip; these associations are formed by the farmers and supported by the government. And in 1978 the Livestock Produce Marketing Services (LPMS) was created as a section of the Ministry of Agriculture to support the WMGAs. In Matsoaing the Makhapung WMGA and the wool shed were created in 1971, and thus the produce were sold directly to a broker in South Africa, reducing the role of traders in the wool and mohair trade. Moreover, the shearing seasons are now organized with the goats being sheared in April and May and the sheep from October to January. In

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1 Between 1900 and 1936, there was a rapid encroachment of Sehalahala into areas where Seboku and Letsiri dominated, because of the high stocking rate. During that period, 187500 hectares of the best pastures were lost (Swallow et. al, 1987).
1982, 73% of Lesotho's exports was wool. However, there are special requirements for quality improvement and not all the farmers can be members of this association. This organization still exists nowadays and the WMGA has become more and more important (see section access to markets). Dipping campaigns have been replaced by injections.

However, the problem of pasture deterioration persisted and the few propositions which were made later on remained inefficient (see text box 4).

**A vain attempt to solve the pasture deterioration**

In the 1980s, reducing the stocking rate and imposing a grazing fee were suggested as a Structure Adjustment Programme*. Although these issues, notably the grazing fee, were discussed many times, they have never been implemented because of the strong opposition of farmers.

More recently, in mid-90s, grazing associations have been created to manage the pastures A and they are supposed to work hand in hand with the Range Land Department, which is a division of the Ministry of Forestry and Land Reclamation. Though the Sakeng-Makhapung-Sehonghong environmental resources management exists, it is not effective: since the access to the pastures is free, there was a misunderstanding of the aim of such associations. Moreover, a membership was required.

* It was demonstrated by Peasley (1989) that in 1980 the stocking rate was of 1 animal/2ha, so 2,1 million animals unit for 3 million hectares (1 animal unit = 1 cattle = 1,5 donkey or horse = 5 sheep or goats). But for Lesotho 1 animal unit/10-16 hectares would result in a maximum production per animal unit “under current management”. It would have been 150 000 to 250 000 animal units, compared to the 1,2 million in 1980.

**Text box 4: failure of the grazing fee and of the grazing associations**

### 4.3 Facing up to the village pasture deterioration and producing high quality wool and mohair

#### 4.3.1 Grazing permit: a radical change in livestock management

In the 1970s, due to the poor condition of village pastures, there was a need for a new scheme for grazingland management. This took the form of keeping the animals away from the village area, on farther pastures all year long: a grazing permit was established in 1973. It ruled the number and kind of animals that would be allowed to stay in the village area (see text box 5).

A new actor appeared, the remunerated herd-boys. Before one could entrust ones child with the daily grazing of animals around the village, but then one had to pay somebody to take care of stock all year long on farther pastures. Indeed, no one would send his own child all year long on the pastures A and B, and the man had to stay at home to work in the fields. Hiring a herd-boy was then standardized: nearly all the families had one son hired as a herd-boy to another family, so as to be paid with animals or money. However, not all the livestock owners could afford to hire a herd-boy. The small ones managed to take care of their animals when they were allowed to stay around the village, during the rest of the year they are entrusted to the biggest owners. As a result, a new kind of mafisa appeared, from small livestock owners to bigger ones. But the consequence was that small owners could not benefit anymore from the wool and mohair sales.

In both Matseng and Tekeseleng stand privately owned little shelters called motebo, where the herdboys live. Those basic houses are stone-made without any windows and surrounded by a kraal to pen the animals at night. The motebo are scattered on the pastures.
The grazing permits are under the principal chief's regulation which operates at the district level. Livestock owners have to ask for it via their ward chief (village level) every year, so as to keep a certain number of cattle, rams, billy goats, horses or donkeys near their village during summer time (from October-November until end of March). Every year, at the end of September, there is a meeting with livestock owners, to decide how many animals will stay in the village area. More or less, each farmer can keep 3 milking cows and their calves, 2 rams, 2 billy goats, 1 horse and 1 donkey. Oxen are not allowed to stay during summer on the village pastures (C pastures): to take some for field work, farmers have to ask the ward chief for a permit, the duration of which is about one to a couple of days according to the task to be performed. Each ward chief delivers grazing permits for his own village. As a result, most of the animals have to be taken on farther pastures during summer (A pastures); the ones that stay are taken to graze only on maboella, a restricted grazing area that has been previously preserved.

Text box 5: A grazing permit to solve the increasing need for feed resources
Since the establishment of the grazing permit, and in the absence of a collective scheme of grazing management for all the users of the grazinglands, the animals were, of course, no more on the village area but on the neighbouring grazinglands. Thus the problem of the deterioration of the village pastures was not solved, that is why a new scheme had been established.

4.3.2 A THREE-GRAZING AREA SYSTEM AS THE CURRENT PASTURE REGULATION

It was decided in 2000 to act on the advice of the Ministry of Agriculture, and with the newly created Community Council, to improve the pasture scheme. A new pasture C, including all the villages of the valley, where no small ruminants can go (except the ones who have the grazing permit or special authorization for lambing and kidding during the winter), and a pasture B (Tekeseleng) have been created (by dividing the farther pastures in two).

The B pastures have been delineated because it was overgrazed and needed to be under regulation. Indeed, several snow disasters, notably in 1988 and 1996, had been responsible for huge stock death: naturally herd-boys were then taking the flocks close to the villages earlier, on Tekeseleng, to avoid the cold. So it has been decided to regulate movements in that area.

Thus, nowadays, the current pasture regulation is for three areas: Matsoaing (C), inside the boundaries of the Community Council1 (geographically, it groups several village areas), and under the regulation of this one and the traditional chiefs, the winter pastures called Tekeseleng (B), where no animals are accepted between the 1st of December and the 1st of April, and the summer pastures of Matseng (A). The pastures B and A are under the Principal Chief's regulation.

Nowadays, as described in the sketch 7 (following page), while the majority of the livestock is on further pastures of Tekeseleng and Matseng, some milking cows, rams and billy goats stay all year long near the village, on Matsoaing. These animals are penned in the kraal at night close to the households, and during the summer grazing period they are taken to graze on the maboella. In winter they are grouped with the other cattle on pastures C and graze in the fields during the common grazing, from June to mid-August.

Nevertheless, even the cattle in Matseng join the ones in Matsoaing during the winter: hence no cattle are seen on Tekeseleng during the winter, notably for the common grazing. Sheep and goats stay on Tekeseleng and Matseng all year long. Finally, pregnant female sheep and goats who are giving birth during winter are allowed in the village in order to give supplemental feeding and to prevent the animals from dying of exposure.

1 Local government authority created in 2005.
Sketch 7: Grazing schedule on pastures A, B and C

Legend:
- multi-purpose cattle
- sheep and goats
- animals with grazing permit (rams, billy goats, 3 milking cows)
4.3.3 Animal Keeping, a Rise in Technical Proficiency

Both the changes that have occurred in the management of the grazinglands, and the government programme for the increase of the animal fibre yield and quality, have contributed to the emergence of new animal keeping practices.

4.3.3.1 Wool sheep and mohair goats: having recourse to permanent extra-familial workforce and supplementally feed for the stock

- Livestock upgrading: more demanding animals
  - Breeding males and castrating the cross-bred animals

With government policies to improve wool and mohair production, the farmers of Matsoaing started to buy improved rams and billy goats to upgrade their hardy animals and the management of animal breeding has become of crucial importance. All the males, except the breeding animals, must be castrated so as to avoid cross-breeding. Farmers used sharp knives and more recently the Burdizzo tool.\(^1\)

- Beware of inbreeding: increasing the male replacement rate

While several reproduction males were used, now each livestock production unit has only one or two reproduction males because of their high cost. Consequently there is a need to avoid inbreeding so as to maintain the gain of fibre quality; the males should not breed with their descendants, and so, according to the life cycle of these small ruminants, should be replaced every 2 to 3 years.

Another way to prevent inbreeding is to separate the reproduction males from the rest of the stock. The rams and billy goats started to be kept in the villages where they are also safe from theft.

- Lambing twice a year

Farmers used to have their sheep lamb only once a year, in spring. But since the climatic disasters (snow or drought) are likely to occur more often, an increasing number of livestock keepers decided to go for two lambing per year for security reasons and forage availability.

- Cross-breeding the pure bred animals with the hardy ones to prevent disease

Compared to the indigenous species, the Merinos and Angoras are fragile and internal parasites started to be a problem: worm infection decreased lamb survival rates. Farmers then started to cross-breed their improved animals with non-improved in order to produce a progeny which is hardier to survive the harsh climatic conditions. As a result not all the males were castrated, but the ones with a good fleece were kept to become the reproduction animals. This practice slowed down the upgrading of the livestock and limited the yield and quality of the wool and mohair.

- Medical care

Although the Basothos have traditional healers to cure their animals, the improved species required yearly preventative injections against internal parasites. These cares are done by the farmers themselves since they have been taught by livestock advisors.

- No more animals in the village area: paying for a herd-boy or entrusting another livestock owner with the animals

The rise in stock numbers has led to several changes in the grazingland management. One of these changes made it necessary to hire a herd-boy so as to take care of the animals all year long far away from the villages. As a result mainly the herd-boys manage the animals while the owners visit

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\(^1\) The Burdizzo is a little tool especially suited to crushing the spermatic cords of a variety of male mammals. It is relatively painless and it lessens the possibility of infection since there is no open wound for parasites to move into.
them more or less frequently so as to keep an eye on the herd-boy and to provide him with food. The owners started to rely on an extra-familial workforce.

However, as long as the owner could not afford a herd-boy, he entrusted somebody with his animals: he did not manage the flock anymore, but could only decide to slaughter or to sell some.

- **Supplemental feeding: progressively necessary.**

  The poor pasture conditions have progressively led the farmers to supplementally feed the stock. This has become of high importance as deficient nutrition contributes to lowering the wool quality. Some of the farmers had enough fields to allocate part of them to forage crop production, whereas others had to buy food for their animals. Anyway all farmers now buy concentrates.

  Not all the animals need supplemental feeding but the suckler animals do: if not their fleece loses its value because the fibres are getting fragile during that period. Furthermore to make the purchase of reproduction males profitable these animals also are supplementally fed before the reproduction to maximize the reproductive efficiency.

- **Fighting against fleece contaminants: avoiding the loss of the clip value**

  The contamination of the fleece by dust, vegetal contaminants or stains causes an important loss of its value. Some practices directly impact on the contamination.

  The first of them is a night paddocking system that has been used to protect the animals from jackals, which is a terrible predator, and theft. However this is responsible for staining the fleece with the excrement. Nowadays theft has remained a major problem, that is why numerous farmers still do night paddocking; the rest of them have to keep an eye on the stock at night.

  Going to the pastures can also be a source of dust and vegetal contaminants. Herd-boys should notably keep the animals away from local vegetal species whose seeds become hooked in the coat.

4.3.3.2 **Cattle: henceforth a second herd-boy and a management in two batches**

Compared to sheep and goat production, cattle production as well as keeping practices have only evolved slightly. Nonetheless since the grazing permit, the recourse to extra-familial workforce has become a necessity. Indeed some of the cattle stay all year long in the village where their produce is required (draught power, milk, cow dung), but sending the children to primary school has become common; in their absence, a second herd-boy is necessary to take the animals to graze daily. The second batch of cattle is grouped with the sheep and the goats under the supervision of another herd-boy.

Furthermore the maize stalks have to be collected to feed the batch of cattle that stay in the village because of the lack of grazing areas in the valley.

4.3.4 **Finally, a rise in the costs of production**

Both the rise in demand for high quality animal fibres and the availability of forage resources has led to the rise in the costs of production. That is why it has become more and more difficult to raise animals and notably to produce wool and mohair, despite its being the main source of cash income.

Indeed the improvement of the fibre production has generated new costs: the purchase of improved rams and billy goats to which must be added medical expenses as those animals are sensitive to the harsh mountain conditions.

Besides, the quality and quantity of the fibres are closely linked with the animals' feeding. Progressively the need for supplementation is almost compulsory. All the more so since the
grazinglands have deteriorated. As a result part of the supplementary food must be produced or bought.

Henceforth the sheep and the goats could not be herded close to the villages but far up in the valley, which was the children's task. It was then necessary to hire a full time herd-boy, which was not affordable for everyone and the small owners had to entrust the larger owners with their animals for mafisa.

In addition, it has become almost impossible for the migrant workers to raise animals despite their investment in livestock production. The reason is that an owner must live in the valley so as to visit regularly his herd-boy or the stock might not increase. Makoa (2005) said that when herd-boys are left by themselves in the mountains, they try to steal from the owner to create their own flock/herd and they even slaughter some animals to eat. Mostly the men are migrant; but it seems that only they can manage the animals. This is notably due to the fact that the herd-boys are so rough that no woman can have authority over them. Moreover visiting the herd-boys on the pastures takes several days, so a woman cannot do it and take care of the children at home at the same time.

As a result, among the farmers, some never managed to create a durable flock/herd of sheep and/or goats. Rearing animals has become less and less accessible and subjected to the attainment of several conditions.

- having a man or a son at home to take care of the animals: if the owner is absent to look after the animals or after his herd-boy the flock does not increase and the animals are sold to provide for family needs, as explained earlier.
- having a long term project of livestock production
- reaching a stock number that covers the expenses of the family, and the production costs and provides enough progeny to compensate for the sales and the slaughtering of animals (mainly for funerals and dowries).

5 Make a living with farming activities: a increasingly difficult task

5.1 Being a herd-boy as part of the traditional way of life

The increase in the number of herd-boys and the establishment of herding as part of a boy's life happened during the early part of the 20th century along with the increase in the individual ownership of animals and with the departure of the animals from the villages.

The young herd-boys wearing a dark Lesotho blanket, a balaclava, the traditional molamu (wood stick), rubber boots, and accompanied by some dogs to protect the flock from theft and jackals, became the key actors in the livestock system. More than herding the animals, they are as well required to work in the fields for ploughing and harvesting (hence many cattle close to the fields during that period, even if it is not the period of common grazing). The ones staying on summer pastures and on farther winter pastures sleep in a motebo, while the ones taking care of the animals staying around the villages all year long go back to the owner's home every night.

Herding animals has become the first stage of a traditional way of life (see table 5). Boys start to be herd-boys from the early age of 6 or 7 and get paid every year with animals: 1 cow or 12 sheep/goats from the elders. Those animals constitute the wealth of the boys and are used to start living on their own. Progressively some owners have preferred to pay their herd-boy with cash so as to avoid exploiting their stock more than its natural increase.
From the 1980s, owing to the overcrowding of the land, new opportunities brought by the school and the attractive fast cash jobs in the RSA gave new possibilities for the boys to « become men » by getting an income.

### 5.2 The breaking of the traditional scheme: A valley highly populated with no opportunities for local employment

#### 5.2.1 Moving closer to the road

The organization of the settlements has changed over the last century, and particularly since the 1980s. A movement of individualizing and living close to the road has been the consequence of a change in the traditional way of life. Since the 1980s, many families have decided to settle down the slope and new villages like Tserela or the lower part of Ha Maile were created. But while in the old and high villages the families used to have their homesteads close to each other, the new trend is to settle far from the other households.

Traditionally, as described in *table 5*, when a man got married and settled, his parents provided the couple with part of their fields. Later, as the family got children, more pieces of land were given by the chief. Thus the number of fields has continuously been growing generation after generation. From the 1980s land became scarce and the area per household did not provide the families with food all year long. Food shortages are now common. The traditional law according three fields per family is no longer possible to implement: the pieces of land allocated are few, small and not suitable for cropping (in steep areas, superficial soils,...). Currently, only the ones that inherit enough fields and animals from their parents manage to rely on farming.

### Table 5: Traditional way of life of men in Matsoaing area

<table>
<thead>
<tr>
<th>Age</th>
<th>Residence</th>
<th>Condition</th>
<th>Status</th>
<th>Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 3</td>
<td>Parents' household</td>
<td>Baby</td>
<td>Totally dependant</td>
<td>Help in other households with farm work</td>
</tr>
<tr>
<td>4/6 - 13</td>
<td>Parents' household</td>
<td>Child</td>
<td>Education and/or help with domestic and farm work</td>
<td></td>
</tr>
<tr>
<td>7/14 - 21</td>
<td>Animal owner's household</td>
<td>Young man</td>
<td>Farm work as shepherd in a none relatives' household</td>
<td>Take care of the owner's animals. Paid with animals or money once a year.</td>
</tr>
<tr>
<td>22 - ...</td>
<td>Own household</td>
<td>Adult</td>
<td>Couple progressively independent.</td>
<td>-Hires cattle to plough their field(s) if no cattle. -Mutual aid for farm work. -Works for others for food or money. -goes a while in RSA to work and bring money home.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(built own house, inherited field(s) and animals from the parents and/or given a piece of land by the chief)</td>
<td>-Become parents and need more fields to feed the children.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Share cropping with other people/create new field</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Daughters' marriage, departure for their husband's household.</td>
<td>-Receives dowry</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Sons’ departure to create their own household.</td>
<td>-Gives fields and/or animals to the sons</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-One son stays and takes care of the old parents.</td>
<td>-Son manages the farm and helps with domestic work.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-When parents pass away the son inherits the parents' possessions.</td>
</tr>
</tbody>
</table>
Moreover, chiefs have been abusing their power to allocate fields to their people. It was argued that only the owners of draught animals would till their fields. As a result, the most vulnerable farmers not only do not own animals but do not have access to the land either.

The new generation is compelled to rely on off-farm activities due to the decline of both land availability and soil fertility. Few of them take advantage of the development of the valley and create new activities such as a Bed and Breakfast, guided horse-riding for tourists, shops or taxi driving in the valley.

Nevertheless, since the valley cannot offer many job opportunities, more and more heads of household go to South Africa to find a part-time job in the mines and in the plantations of Kwazulu Natal. The rest of the family stays in the valley and relies on migrant remittances. This scheme is not new but now men are staying longer away with sometimes no project to come back to. This was a factor of change for the new settlement organization: because no more arable land is available and livestock production is inaccessible, it is now out of the question to live in a place both close to the fields and the pastures. The new generation is looking to be close to the road. That is how the village of Tserela was created 25 years ago.

![Characteristics of 3 generations of the same family in Matsoaing](image)

### Proportion of families relying on farming according to their place of living

<table>
<thead>
<tr>
<th>Place of living</th>
<th>Field owners</th>
<th>Animals owners</th>
<th>Dependent on off-farm activities</th>
<th>Rely on migrant remittances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up the slope</td>
<td>87%</td>
<td>64%</td>
<td>30%</td>
<td>25%</td>
</tr>
<tr>
<td>Downslope</td>
<td>55%</td>
<td>40%</td>
<td>35%</td>
<td>45%</td>
</tr>
</tbody>
</table>

Remark: The percentages are based on the total number of families who lived in the villages. This corresponds to 69 families who lives in Ha Maile up, Tlapa-Le-Putsoa and Matsoaing, three villages located on the slopes, and 20 families who lived in the valley in Tserela and Ha Maile down. The villages of Matakheng and Makhapung, located in the valley, are not taken into account because they distort the results. In fact those two villages are located downslope but as they are old villages, the trends highlighted by the table and the sketch are in process within them.

**Sketch 8: Migration of the population downslope and decline of farming activities**

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In sketch 8, the genealogical tree of a family illustrates the movement toward the lower part of the valley and the reliance on off-farm activities. Furthermore the migrant remittances are hardly invested in farming activities, hence in the population lower down the valley, which is mainly constituted of the younger generation, less than half owns animals. Moreover, the work in South Africa often engenders monoparental families.

In parallel, people have become more and more individualistic and do not want to settle anymore near their relatives in the villages. This trend became important with the British protectorate, which promoted the primacy of the individual over the group to undermine the solidarity of the extended family (Gill, 1993). The migrant labour has pursued the process of individualization. The young boys become men by working in the mines and the women become more autonomous to manage their household during the husband's absence. Nowadays, while some follow the traditional scheme, more and more settle apart to have a greater freedom, individual initiative and choice.

- **Migrant worker as a « way of life »**

In the 1870s, the role of men changed both in the homestead and in the wider society. In agriculture it was limited to the time of spring ploughing in September. The rest of the year, a large number of men went on short term contracts to the mines (the diamond mine of Kimberley opened in 1870 and the gold mine of Witwatersrand in 1885) or built rail road lines in South Africa. The Basothos started to rely more on migrant labour which was inversely related to the size of the maize harvest and the wool market price (Libby, 1987). Young men gained adult status by working in the mines and less through traditional initiation schools. But during the 20th century, the evolution of the way of life, the open-mindedness on the “modern world” in the RSA and the little space available to live from farming in the valley led to fewer investments of migrant remittances into livestock or agriculture, but more, when the income is sufficient, into manufactured goods. Anyway, the rise in the cost of livestock production made it difficult to invest in wool and mohair production. Henceforth, the primacy of locals' employment in the RSA has led to the Basothos no longer working in the mines: they now work in the sugar cane plantations.

### 5.2.2 Mono-parental families, an increasing family scheme

For some, the migrant working situation led to a weakening of the social ties with home and family. Migrants, on their return, felt like foreigners in their own home. This led to a lower willingness to send money to their family, making the dependants find cash income-generating activities in the informal sector. In addition to this, a large number of migrant workers died prematurely or did not come back from the RSA: many died from HIV/AIDS or from other diseases caught in the mines or in the plantations. As a result, families are left in trouble and without an income.

As a result, new family schemes are becoming more important to the population in the Mastoaing area. They are mono-parental families (widows alone with their children) and grandparents (or often grand-mother only) living with grand-children because the parents died. However, even when the husband is still a member of the family but works in South Africa, he is most of the time away.

The consequences, for those mono-parental families of having no man at home anymore are multiple, and lead to a new organization of farming activities:

- women cannot do the tilling because it is a man's task, so somebody must be hired to plough and sow. This has a cost and women have to cultivate by hand, using sickles and hand hoes, whereas others have higher productivity of labour due to their use of the harrow and the cultivator.
– those families are often the ones who got the last fields on steep slopes that are badly exposed to erosion: not only do they lack arable land, but they also have poor fertility levels and low yields. Besides, some families are even landless.
– for the ones who have some animals, the man is not there anymore to manage them. Except if a son or a relative can take care of the stock, it is often given in mafisa to other farmers, losing the chance to get cow dung or cash income from the wool and mohair.

Those vulnerable families, notably the widows, have income neither from the animals nor from the husband, and need to find new activities to get money and food. This is why we can frequently see women brewing beer or collecting firewood to sell it. Moreover, it is harder and harder to live only from crop production: even the families with a man at home need to find off-farm activities to compensate for low grain production and to buy manufactured goods.

In addition, since the 1980s, the sekoropo (“working for others” in Sesotho), a new form of work has become common. People who have not enough fields, no fields, or only a few small-ruminants (that they have to entrust somebody with) work in others' field, notably for hoeing and weeding, to get paid with grains or money. Nevertheless, this work can evolve in to working in another house cleaning or washing the clothes.

In parallel, some widows who have fields cannot work on all of them and need to practise share-cropping-out (seahlolo, see below) on some fields to get a harvest. The share-cropping-out concerns also the families who have no means of hiring somebody to plough: even if they only possess a little field, they need to do the seahlolo, which leads to a very small harvest.

● **Seahlolo:** Share-cropping. The owner of the field does a share-cropping-out while the people cultivating his field are doing the share-cropping-in. The amount of the harvest shared varies approximately from 25 % to 50 % according to what the share-cropper-in brings (if he brings seeds, tools and draught power, he will get 50 % of the harvest)

### 5.2.3 Soil erosion severely lowering the yields

Those “new” families are not the only ones affected by a lack of grain production. Not only the yield of the fields located on steep slopes is severely lowered because of land erosion. All the families are struck with low harvest, the reasons are notably continuous cropping of row plants, little restitution of fertility to the soil and no fallow period.

“Since I settled in 1994, I have lost about 30 % of the yield” farmer in Mathakheng

Farmers are now more worried about ploughing on time and the sepane are becoming more important. Besides, farmers are more vulnerable to climatic hazards (drought or late frost), as the harvest does not permit a surplus. The three bad harvests in a row, from 2004 to 2007 led them to rely on the World Food Program. The poorest farmers were provided with food until April 2008.

### 6 A response to soil erosion and land scarcity: development of high added value farming activities requiring little space

With the scarcity of land and the need of farmers to get cash to buy food and manufactured goods, new farming activities start to be developed: vegetables, poultry (indigenous Likoekoe) and sometimes Muscovy ducks (*Cairina moschata*). These activities are mostly implemented by women, creating high added value and requiring little space. Unlike cattle, sheep and goats, women have complete power over poultry production and vegetable gardens.
Although these activities were known for a long time, they became of greater importance with the arrival of an Agricultural Extension Advisor in 2004. However, the link with local markets in Mokhotlong is almost non-existent. Moreover, since the entire population of Matsoaing is constituted of subsistence farmers the outlets for this produce in the valley are low and not many farmers sell the produce.

- **Extension and government decentralization**

  The government of Lesotho is introducing Local Government in order to improve the livelihood of the citizens. The objectives of the decentralization is to bring services closer to people, to promote people's participation in decision making, planning and implementation of development programmes.

  In that way, the Ministry of Agriculture, has placed an Agricultural Advisor in the Matsoaing area since 2004 to support farmers and develop new cash income-generating farming activities. Thus, groups for poultry production, piggery, vegetables gardens and so on, have been created to buy seeds, poultry, exchange experiences and sell the produce. Apart of that, the department of agriculture does extension about HIV/AIDS by promoting support groups composed of volunteers villagers who will then inform people in their villages about the importance of vegetable consumption for HIV positive persons.

  Furthermore, in 2005, the Community Council was created. It is working with traditional chiefs, with whom it shares the authority. It is notably in charge of field allocation and pasture regulation, thus giving opportunities to some families who could not get fields from the chiefs, to get one today, even small. However, since it is new, the role of the Community Council and of the traditional chiefs is not yet clear.

7 Agrarian history of Matsoaing area: Key points

The *scheme 1* p.42 illustrates the main trends of Matsoaing's agrarian history.

### 7.1 The colonization of Matsoaing in the later 19\(^{th}\) century

- **Grazing areas put under cultivation and sheep and goats raising for fibre production**

  The first settlers came from the overcrowded Lowlands to find new areas to cultivate. At that time, Matsoaing was a wide grazing area, which was put progressively under cultivation on the lower parts, and welcomed cattle, sheep, and goats, to graze on the upper parts. Farmers planted maize below 2.300 m.a.s.l and wheat above 2.500 m.a.s.l, and in fewer proportions beans and peas. The main tools were the sickle and the handle hoe and a few owned the plough.

  Some farmers combined those crop systems with livestock management systems of multi-purpose cattle, and indigenous sheep and goats. The wool and mohair production was already a cash income-generating activity, but only few owned animals, and the bigger part of the flock was the chief property. Many farmers were only having a cropping activity, waiting for opportunities to keep livestock.

  A small part of the livestock was grazing all year long around the villages but the rest was taken to the further pastures, on *Tekeseleng* and Sani Top.

### 7.2 An early differentiation of the farming systems: 1900-1950s

- **Farms mechanization and booming of small ruminants' keeping**

  The migrant labour as a “way a life” in the early 20\(^{th}\) century led the families to get more money to invest in the farming system. Many farmers bought a hillside plough and had the opportunity to
get animals so as to increase the wealth of the family. As the chiefs were not anymore the wealthiest persons in the valley their role started to decrease.

The booming of investments engendered a dramatic increase in livestock number, notably of the small-ruminants, and an overstocking around the villages. The old system of maboella was undertaken to regulate the animal movement on the pastures.

This movement toward increasing animal ownership was slowed down by the crisis of the 1930s. The small livestock owners constituting a flock had to slaughter all the animals to compensate the lack of grains production, thus starting again the capitalization process from zero. On the other hand, the larger livestock owners had problems of infectious diseases but could save a part of their animals to increase the herd again afterwards.

In parallel, the big slump led to the specialization of colonised countries towards exports products, to the detriment of subsistence crops, (Ki-Zerbo, 1992). So the government, which was under British protectorate, started to implement policies to improve wool and mohair quality. But the smaller owners could not afford to pay for an improved ram while the others were getting higher prices for their wool and mohair clips, increasing the discrepancies among farmers.

7.3 Post independence, differentiation’s speed up; 1960-1980s

- A more and more difficult access to wool and mohair cash income and towards Matsoaing area’s overcrowding

Since Independence, the government has been more and more involved in improving wool and mohair production and quality in order to promote the exports and get foreign currencies for the country. Wool and Mohair Growers' Associations were created to enhance the efforts, but their membership was limited to the farmers who could afford to buy improved rams and pay for the membership fees. At that time, the small owners were left behind and were still obliged to shear at the trader's shed, thus getting less money than through the government sheds.

In addition, because of the high number of animals around the village, a Grazing Permit was established for animals grazing on the village pastures (pastures C). Since that time, all the livestock owners had to hire a herd-boy to have their animals graze on further pastures: the small owners, unable to pay for it, had to entrust the larger owners with their animals until the flock get big enough to take them back, thus losing the chance to get money from the wool and mohair clips.

In parallel, the arable land availability has tended to decrease due to an overcrowding of Matsoaing. The farmers have been obliged to intensify their agricultural practices to fight against decreasing yields. The harrow and the cultivator were introduced in the 1980s and improved the efficiency of the agricultural practices. But those tools were not affordable for small-scale farmers who did not have animals at that time, and are still owned only by few farmers. Moreover, the chiefs were reluctant to allow farmers without tools nor animals to create new fields, thus increasing the difference for access to arable land.

7.4 More and more farmers structurally dependants on off-farm activities: 1980-2000s

- New activities: remunerated farm work and high added values productions

Since the level of life increased and the yields decreased, different strategies have raised. Some are definitely on the way to leave agriculture to rely only on migrant remittance, or on tourism activities, and are moving closer to the road. But the majority try to find alternatives to live in the valley.
The livestock owners, getting more and more improved animals, have to pay for more and more veterinary medicine because they are more sensitive to the harsh mountains conditions than indigenous breed. Hence bigger flock are observed to compensate to higher expenses. In parallel, a farmer without fields decided to go for meat production thanks to good market opportunities in South Africa and the ongoing development of Mokhotlong. However, this was possible thanks to investment of an administrative job's salary.

Small subsistence farmers, without opportunity to get animals, have to develop more and more off-farm activities providing small cash incomes: work in others' fields, brewing beers, roofing, selling firewood etc. But new farming activities, requiring little space and of high added value are being developed by women with the support of the Ministry of Agriculture: vegetable and poultry production. Although the market accessibility is still low for those produce, they are a way to get another source of cash and subsistence income and to improve the diet, notably in case of sickness (HIV/AIDS or others). Moreover, unlike the fields, the access to land for vegetable production is easy: local authorities give without any requirement a piece of land to create a garden.

Unlike wool and mohair production, no visible evolution for field crops has been observed in the valley since the first settlements. The livestock production has been highly supported by the government and farmers had interest to develop it because everything has been organized, from the production marketing. Crop production has not benefited from such supports and hence, the farmers have not seen an interest in improving practices and develop more this activity.
<table>
<thead>
<tr>
<th>Settlement – 1870's</th>
<th>Present time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Natural environment</strong></td>
<td>Mountain agriculture in the lower valley and herding in the higher part and high plateaus.</td>
</tr>
<tr>
<td>High valley and plateaus suitable for summer grazing.</td>
<td><strong>LAND MANAGEMENT</strong></td>
</tr>
<tr>
<td>Grasslands progressively put under cultivation.</td>
<td>Soil fertility and pasture condition</td>
</tr>
<tr>
<td>Cultivation by hand. Primacy of maize and beans down the slope, wheat and peas in the higher part. One cropping cycle per year.</td>
<td><strong>Human activities</strong></td>
</tr>
<tr>
<td><strong>Crop system</strong></td>
<td>Degradation of natural resources</td>
</tr>
<tr>
<td><strong>Livestock system</strong></td>
<td><strong>SOIL FERTILITY AND PASTURE CONDITION</strong></td>
</tr>
<tr>
<td>Male herding of fat tailed sheep, Boer goats, Sotho cattle on communal grazing areas. Few Merinos and Angoras.</td>
<td><strong>Size, number of fields per family</strong></td>
</tr>
<tr>
<td><strong>Economy</strong></td>
<td><strong>Use of handle hoe</strong></td>
</tr>
<tr>
<td>Domestic economy. Small wool and mohair market dominated by privates.</td>
<td><strong>Soil fertility</strong></td>
</tr>
<tr>
<td><strong>Social organisation</strong></td>
<td><strong>Mechanization</strong></td>
</tr>
<tr>
<td>Community of extended families relying on subsistence farming and for few on animals production. Migrants' income invested in agriculture</td>
<td><strong>Weed's importance</strong></td>
</tr>
<tr>
<td><strong>Investment in agriculture</strong></td>
<td><strong>Agricultural extension</strong></td>
</tr>
<tr>
<td><strong>Traditional authority</strong></td>
<td><strong>Wool and mohair commodity chain structuring</strong></td>
</tr>
<tr>
<td><strong>Family links</strong></td>
<td><strong>Community of nuclear families relying on migrant remittances or livestock production or unqualified daily jobs.</strong></td>
</tr>
<tr>
<td><strong>Livestock possession</strong></td>
<td><strong>Individualistic lifestyle</strong></td>
</tr>
<tr>
<td><strong>Migrant labour reliance</strong></td>
<td><strong>Culled cattle for draught power and milk.</strong></td>
</tr>
<tr>
<td><strong>-Remote mountain areas colonized for mixed farming.</strong></td>
<td><strong>Wool and mohair production.</strong></td>
</tr>
<tr>
<td><strong>-Little tillage by animal traction and livestock ownership concentration.</strong></td>
<td><strong>Woman small stock's production.</strong></td>
</tr>
<tr>
<td><strong>-Migrant labour remittances are invested the growth of the farms</strong></td>
<td><strong>Slow transition towards market oriented economy. Animals fibres sold through the government on the international market.</strong></td>
</tr>
</tbody>
</table>

**Scheme 1: One century of agrarian history in the Matsoaing area**
8 A functional typology to highlight the agrarian dynamics

The different farming systems observed are the consequence of the historical evolution. The typology of these systems is based on different factors:
- the wealth of the family, linked with animal ownership and the possession of tools,
- the farming activities: cropping, mixed crop - livestock production, only livestock production.
- the reliance on off-farm activities.

<table>
<thead>
<tr>
<th>Farming system 1: families leaving agriculture (18%)</th>
<th>Livestock production:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop production:</td>
<td>None</td>
</tr>
<tr>
<td>1 field (0,2ha)</td>
<td>Off-farm activities:</td>
</tr>
<tr>
<td></td>
<td>Almost exclusively rely on non-agricultural activities (part time job in South Africa or job in the valley)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Farming system 2: subsistence farmers structurally needing off-farm activities (35%)</th>
<th>Livestock production:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop production:</td>
<td>None</td>
</tr>
<tr>
<td>1 field (0,5ha)</td>
<td>Off-farm activities:</td>
</tr>
<tr>
<td></td>
<td>Off-farm activities: roofing, sekoropo, brewing beer, selling firewood</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Farming system 3: farmers making saving with animals (20%)</th>
<th>Livestock production:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop production:</td>
<td>15 Merino sheep and Angora goats given for mafisa</td>
</tr>
<tr>
<td>1 field (0,5ha)</td>
<td>Off-farm activities:</td>
</tr>
<tr>
<td></td>
<td>Off-farm activities: roofing, sekoropo, brewing beer, selling firewood</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Farming system 4: mixed crop and livestock farmers, wool and mohair growers (27%)</th>
<th>Livestock production:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop production:</td>
<td>2 herd-boys</td>
</tr>
<tr>
<td>3 fields (1,2ha)</td>
<td>60 Angora goats</td>
</tr>
<tr>
<td></td>
<td>70 Merino sheep</td>
</tr>
<tr>
<td></td>
<td>25 dual-purpose cattle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Farming system 5: large livestock owner specialized in meat production</th>
<th>Livestock production:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop production:</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>8 herd-boys</td>
</tr>
<tr>
<td></td>
<td>1200 mutton Merino</td>
</tr>
<tr>
<td></td>
<td>390 beef cattle</td>
</tr>
<tr>
<td></td>
<td>Butchery in Mokhotlong</td>
</tr>
</tbody>
</table>

The percentage of each farming system is based on data obtained during the census of households.
FARM DIFFERENTIATION: HAVING ANIMALS OR RELYING ON OFF-FARM ACTIVITIES

1 A family organization with a common ownership of the possessions

1.1 THE FIELDS: COMMUNAL LAND MANAGED AS A PRIVATE PROPERTY

The fields are received from the chief and from the parents from generation to generation, leading the families to have a real feeling of ownership. The chief may not repossess the fields from the families unless they are left fallow for a period of more than two years without the chief's permission.

1.1.1 PARENTS: THE TWO FARM WORKERS

A typical family is composed of the two parents, two to three children and one dependent (a grand parent). Both parents are required to do the field work and the other members of the family give a hand with the domestic work.

The fields are “owned” jointly by husband and the wife and only the field activities are divided between them according to the nature of the activity. Thus the management of the crop system is decided by these two farm workers. As noticed on the sketch 9, men are in charge of the tilling with animal traction, whereas women are involved in manual tasks. Although the field work is the responsibility of the family, the harvest, which is labour intensive, may require collective work.

1.1.2 TRADITIONAL VARIETIES, A SECURITY FOR GRAIN PRODUCTION

Only traditional varieties are grown in the Matsoaing area for two main reasons: 1) The family cannot afford to buy improved varieties. Their price is high and they have to be bought every year (about M200/10 kg, whereas according to the agricultural practices 120 kg are required per hectare which is about two thirds of the annual survival threshold, see section technical and economic performances). Although the improved varieties yield more, they are sensitive to climatic hazards whereas the traditional varieties are more resistant: in case of early frost or drought, the improved varieties would not yield at all, while the traditional ones will yield, even if only a little. In conditions of high climate variability small-scale farmers prefer to have the certainty that they will have at least a little production to feed their family, rather than risking nothing.

In addition to this, the traditional varieties are not only hardy varieties, but are also well suited to the farmers needs. In the context of a low level of mechanization, the traditional varieties have the
following attributes: little labour requirement, tolerance to frost, multi-purpose usage, and provide both grain as well as seeds for the following season in addition to the possibility of storage for a long period (see appendix 4 for further information about the use and the agro-ecological characteristics of the crops grown in the context of Matsoaing traditional agriculture)

1.1.3 CROP ROTATION: A MISUNDERSTOOD CONCEPT

The concept of “crop rotation”, and the importance of planting wheat and maize, was learned at school and had quite a big influence on how farmers approach their crop management today. Indeed, there is a general belief that crop rotation is simply exchanging seeds with other people, in order to change the seeds' origin every year. As a result, when the family has only one field, the field is used solely for wheat or maize production, but with the belief that crop rotation has been conducted, simply because different seeds have been used.

1.1.4 AN INTERACTION BETWEEN THE MAIZE AND THE WHEAT STOREY

● The exchange of wheat

As maize is the main staple food crop, farmers of the wheat storey are willing to exchange part of their harvest. And farmers of the maize storey need wheat to cook bread. The exchange terms are a bag of 80 kg of maize for a bag of 80 kg of wheat. However, the wheat yields more than the maize, thus the food shortage occurs mainly in the maize storey. Consequently, there is less maize to exchange and once the main staple food crop becomes scarce, the exchange is over. So the farmers of the wheat storey can get maize only during a short period of time, for a few months after the harvest. After this period, if an exchange is done, a higher quantity of wheat than maize is negotiated.

● A mutual aid for the harvest

People of the wheat and maize storey are closely linked for the field work, notably for the letsema. Indeed, for the harvest of wheat each farmer invites people of the valley that he knows to participate, for beer for the men or a basin of grains for the women. Thus, farmers of the maize storey help the farmers of the wheat storey: some farmers grow wheat down the slope but in lower quantity and in consequence, the harvest is done fast. This mutual aid is possible thanks to the difference between the harvesting time of maize and of wheat (the wheat is harvested one month earlier), and because the harvest of wheat down the slope is always earlier than in the wheat storey.

Contrary to wheat, maize harvesting and post-harvesting operations require a lower work load, thus there is little mutual aid.

1.2 THE ANIMALS: THE FAMILIES' WEALTH BUT THE MEN'S BUSINESS

Though the animals are the family's possession, the women do not have any authority in the livestock management, and so are little involved in livestock production. Besides, a custom forbids the women to come close to the kraal. As a result, the widows do not manage animals after the husband has passed away: the flock/herd becomes the son's property if he is old enough, or is given in mafisa. Nevertheless, the decision on utilizing the money from livestock production is not simple that of the man. It is a collective decision of the man and his wife.

Animals are managed as a common family good: when the sons are hired as herd-boys, their animals are grouped and managed with the ones of the parents. Most of the time, one of the sons is compelled to be the herd-boy for his family and thus he becomes livestock owner early, from the age of 7 or 8. Indeed, the parents give him animals every year.

When the parents become old, their animals are inherited by the sons, each getting an equal
share. But if one of them decides to settle out of the parents' household before inheriting, he has to create his flock by himself, starting from zero, or from the animals he got when he was a herd-boy.

The son staying in the household of the parents gets a double share: his share given directly to him, to create his own flock, and the one which he manages for his father. Indeed, although the son manages the household's flock when the parents are old, the father still owns animals to have a certain autonomy for decisions to sell or slaughter. The economic management depends on the owner while the technical management is a common decision. However, this kind of individual decision for economic purposes occurs only for an exceptional need (replacement of a blanket, purchase of a heater etc.)

Thus the animals of the household are managed as one livestock management unit. The income generated with that unit, and the expenses, are not divided at the will simply of the owner but rather by a collective decision.

2 Families leaving agriculture to rely almost exclusively on non-farming activities (Farming system (1): 18 %)

2.1 Field size not sufficient to provide a living for the family

These farmers often belong to the present generation. The parents did not have enough fields to provide each of their sons with a piece of land. So at least one of them chose to move closer to the road in order to have greater ease in finding employment. These newly settled families would normally ask for a field from the Community Council, but nowadays only small areas of a maximum of 0.2 ha are available and are not only located on steep slopes, but also far away from the home. Some of them still have no field at all, but may have asked for one and might be awaiting agreement from the Community Council. And while it is so, they continue to receive a share of the harvest from the parents' fields.

The crop system is based on a continuous intercropping of maize and beans. As there is only little mechanization (only sickle and handle hoe), a person (with tools) is hired to plough the field every year. While the husband is often away to look for a job, the woman is left alone with the domestic and field work. Moreover when the migrant remittance is too small, women have to work on others field for food or for money. As a result, only little work is done in the family's field(s) which seriously lowers the harvest yield (see work load for the farming activities in appendix 10). In addition, the location of the field, normally on a steep slope, causes a high erodibility and low yields.

2.2 A part-time job in South Africa as the main source of income, a precarious situation

Although every year the field is under cultivation, it can only provide food for the family during a short period of time. The husband has to work in South Africa, in the mines sometimes, or in the plantations to earn money. He is away most of the year, he sends remittances three to four times a year through the National Recruitment Center (if he works in the mines) or through somebody traveling to Lesotho (if he works in the plantation). Thus, the rest of the family is highly dependent on these remittances and vulnerable if they comes late or do not come at all.

Furthermore because a high proportion of migrant workers die prematurely or do not come back, the wife and children are left alone. Consequently, these monoparental families often have then to rely again only on farming activities, but it is hard, due to the little size of the field and to the little
access to tillage by animal traction. Their new situation is very precarious and close to the one of
the subsistence farmers needing structurally to have off-farm activities to survive (see farming
system (2)). Moreover, in rural mountains, once a woman is widow or divorced, she seldom gets
married again and relies on the husband's family to help her with the field work, and to provide her
and the children with food to compensate for the very low production.

2.3 Few opportunities to rely on jobs in the valley

The Sehonghong valley is progressively getting amenities and services, giving some people the
opportunity to find jobs linked with the development of the valley (taxi driver, work in one of the
two shops) or with tourism (horse-riding guide, bed&breakfast employees). Unlike the majority of
Matsoaing inhabitants, this group of farmers relies more on those off-farming activities than on
farming activities to make a living. However, the job opportunities in the valley are scarce and only
a few persons can take advantage of this development for the moment.

3 Subsistence farmers gravitating to off-farm activities
(farming system (2): 35 %)

The families have only a small field, in the maize or in the wheat storey, but do not own cattle,
sheep or goats. Thus, cropping is the only farming activity and farmers are dependent on others to
till their fields.

3.1 Crop production (Insufficient): the core of the farming system

A part of the fields comes from the parents' inheritance and another part has been provided by
the Community Council or earlier by the chief. The average size of the cropping area is of 0,5 ha,
implying grain production too low to provide food for the family all year long.

- The maize shortage begins from January, the wheat shortage 2 months later
- The beans and peas are used as condiments. There is little bean shortage while the peas are
  only enough for one month of consumption.

Depending if the family is living in the wheat or in the maize storey, the crop system is based on
a continuous intercropping of maize and beans or a continuous multiple cropping of wheat and peas.
The family workforce is composed of both parents. The availability of equipment for crop
production is low: only sickles and short handle hoe are owned, thus making essential the hire of
somebody to till the field.

- Manual tools (sketch 10)

The sickle (1) is a sharp curved piece of metal with a small handle
made of wood or of cloth.
The handle hoe (2) is a tool with a flat blade attached at right angles to
a short handle made of wood. It is used to dig the soil to remove the
weeds.

In both maize and wheat storeys, no fertilizers are put on the fields. The only organic input is
cow dung, dropped by the cows during the common grazing period.
3.1.1 Maize and Beans: A Big Difference to Mechanized Farmers

3.1.1.1 A critical period to sow the maize

September is the beginning of the vegetation season. Maize must be sown in sufficient time to get its required heat units. Otherwise it would not achieve its life cycle before the frost is back (see maize cropping calendar in appendix 5).

Because of this, sowing on time is of high importance. But the families rely on the owners of the ploughs, who represent only one third of the farmers of Matsoaing, to sow for them. Sometimes the man helps the owner of the tool and animals to plough his fields so as to benefit from his plough. But the owners of the ploughs plough first their field first before ploughing for others. For that reason, the field is sown later, sometimes up to mid-November.

Maize and beans are sown in intercropping, at the same time: the seeds are mixed together.

3.1.1.2 Tillage: essential to improve the soil condition, but difficult without mechanization

The main weed, Lechuchuta (Tagetas minuta), grows fast, so the weeding is of crucial importance till the stalks reach 45-50 cm. Otherwise the yield is severely lowered. A first weeding is done with the handle hoe in November, and then two weedings are necessary, in January and in March, and are a female activity. Because these farmers have no draught animals or cultivator the cultivation is done by hand: it is slow and exhausting, thus undermining the efficiency of the weed removing. Moreover, in March, Lechuchuta is already high with deep roots and is hard to remove.

Furthermore, the field undergoes a severe erosion notably due to its location on the slope. Some mechanized work, like ridging with a plough to preserve the soil from rain erosion and to retain the water, cannot be done because the families cannot afford to pay for it. Thus, the crop is vulnerable to water scarcity.

3.1.1.3 The harvest of maize grains, a critical step

Maize is harvested when dry, but without human intervention the moisture content in the plant remains and the risk that the grain rots is high. Cutting the whole plant and making heaps to let it dry, or pollarding the maize, are ways to have both stalks and grains well dried.

But since the family does not own animals, only the ears of maize are harvested and brought back home; the stalks are no cut because the operation is time consuming. Moreover, the lack of time (because of work on others field) does not allow the pollarding either: in that case, climate hazards can ruin the harvest.

Sometimes the stover is sold to livestock owners. The agreement is that these farmers are in charge of cutting the maize and making the heaps. Then the field's owner collects the ears when dry, while the stalks are collected later by the other farmers.

Because of the food shortage, the grains are removed from the cob and immediately eaten after the harvest, at home. Part of the work is done by beating the ears with a stick. And part is done by hand so as not to burst the cob. It is then used as a combustible for heating or cooking. According to the severity of the need for food of the family, a bag of seeds is kept for the next planting season (80kg/ha) or not. Only the thicker seeds from the ears with straight lines of grains are chosen. If the seeds cannot be kept, then some will be asked for from other families.

The yield ranges from 400 to 1000 kg of grains per hectare.
3.1.1.4 Beans: grains for food, dry plant for fuel

Beans are harvested once the plant is dry, in April, and yield about 200 kg of grains per hectare (see the beans cropping calendar in appendix 5). The harvest consists of removing by hand the whole plant and bringing it back home in bags of 80 kg on a donkey's back. The plants are then put into a heap and beaten to extract the seeds from the pods. The vegetative part is used as a combustible which is very important because farmers with no cattle have no cow dung for fuel.

Seeds are stored in bags and a proportion is normally kept for the next planting season (80 kg per hectare). However, sometimes the families cannot keep that part of the harvest because they consume it. Then, seeds are asked for from wealthier families to enable beans to be planted again the following cropping season.

One can assume that this crop system, with mainly cultivation by hand, gives a low yield because no prevention of soil erosion is done, and weeds cannot be removed effectively. But because of the field characteristics (location, micro-climate) and because of the high variability of climatic conditions, it has proven to be impossible to estimate accurately the difference in yield compared with a mechanized crop system.

3.1.2 Wheat and peas cropping in the upper storey, little-tillage demanding crops

As the wheat yield (about 2000 kg/ha) is more than double that of maize (despite the fact that it maize is intercropped with beans), the farmers growing wheat can provide their family with food for almost the whole year. Indeed, the wheat consumption is finished by the end of March, while the maize is finished in January. Moreover, the wheat harvest is earlier than that of maize, thus reducing the period of food shortage (see the wheat cropping calendar in appendix 5).

In addition, the cropping of wheat requires a little tillage compared to maize. Only two ploughings are done, the first one to remove the weeds, and a second one to sow. As a result, the difference between more capital intensive farmers (tool and draught animals) and those who are less capital intensive (cultivation by hand) is less important in wheat and peas production than maize and beans production.

The crop management sequence for wheat is closely linked with the climatic conditions and the growth stage of the plant as noted on the sketch 11.

<table>
<thead>
<tr>
<th>Climatic conditions</th>
<th>Rainy season</th>
<th>Time for planting</th>
<th>Ear emergence</th>
<th>Plant perfectly dry</th>
<th>Risk of frost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat growth stages</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Sowing</td>
<td></td>
<td>Weeding by hand</td>
<td></td>
<td>Ploughing</td>
<td></td>
</tr>
<tr>
<td>Harvesting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sketch 11: Correspondence between the growth stages of the wheat and its agricultural practices

3.1.2.1 An essential weeding control

Up to 2,500 m.a.s.l, weed control is of such importance that a first tillage is necessary, obliging the family to hire twice, firstly somebody to plough for the weed control and secondly for sowing. Farmers practise a first ploughing in May or June just after the harvest, to fight against wild oat (Avena fatua L.), locally named Belete. In this way the growth of the weed is enhanced and animals graze it during the common grazing before it subsequently seeds. Such a practice enables the
reduction of the stock of seeds in the ground. The multiple cropping of wheat and peas is done every year.

Sowing wheat and peas is done in September and October at the beginning of the rainy season, by broadcast sowing and at the same time covering the seeds by ploughing. The peas are the main condiments grown in the wheat storey. Wheat and peas are sown at the same time, with peas occupying about 10% of the field. One terrace is sown with peas every year and rotates with the wheat terraces.

According to the variety, the period of sowing differs, in late August for the Boland variety, up to November for the Lebua and Mapili early varieties. Thus, it is not a problem if a family has to wait for the availability of other people to plough its field if the Lebua or Mapili varieties are sown. Whatever the varieties of grain planted, and whatever the life cycle, the sowing calendar is arranged to achieve a simultaneous harvesting of the wheat. The reason that this is done is to reduce the higher loss of production to birds.

Because wild oat undermines wheat growth, weeding is essential. As wheat and wild oat look alike, weeding can happen only once the ear emergence growth stage is reached, from January to February. As wheat is not a row crop, the use of a cultivator is impossible and weeds must be removed by hand. However, no weeding can be done on the peas because the roots are so soft that weeding could pull them out.

3.1.2.2 The wheat harvest, a collective effort

The harvest and post-harvest period stretches from April to June. The letsema enables the wheat to be harvested quickly. The first task consists of cutting the whole plant with a sickle and grouping it in a heap; it takes approximatively one day with 15 to 20 persons for 0.5 ha. Threshing is the next step: a broad level area of bare soil is moistened before spreading out the wheat. A team of several cattle are forced to trample the wheat in a circular movement to separate the precious grain from the stalks. However, some of the wheat is first threshed by hand in order to keep the stalks to repair the roofs (these are sometimes sold for M10 per bunch).

On the third day the winnowing, which is exclusively a female work, takes place. The chaff is removed by tossing the grains into the air to let the lighter hulls blow away.

The males participating in the harvest are provided with beer, whereas the women are paid one basin of wheat grain each (9 kg).

A normal year provides about 24 bags of 80 kg for one hectare, of which more than one bag is kept for the next cropping season. Indeed, no farmers, mechanized or not, can afford to pay for the improved varieties, and the traditional varieties are not available in the shops.

3.1.2.3 Peas: harvested green and dry

Some of the peas are harvested green in early January and February. Otherwise the harvest takes place in April and about 15 to 20 kg of dry peas per are are collected. The whole plant is pulled up and beaten on a stone to extract the seeds from the pods. The quantity of seeds used to sow is very high because of weed competition (one third of the harvest).

(see the peas cropping calendar in appendix 5)

3.1.3 The milling, at home or in Mokhotlong

The wheat and maize grains are milled little by little, according to the need of the family thanks to a mill at home or in the neighbourhood. However, this applies only to a small part of the harvest, and the major part is milled at the mill of Mokhotlong, for a fee of M2 per tin of 20 liters (about
which means that one must pay a round trip to get there.

3.1.4 Production even lower when the family has no means

Sometimes the field is share-cropped-in (seahlolo) because the family lacks seeds or means to hire somebody to plough. As a result, if the share-cropper-out brings the seeds and does all the work on the field he gets 50% of the harvest, thus decreasing the share of the family who owns the field. Furthermore, the fields share-cropped are never for maize production because the yield is too low to share the harvest. Consequently wheat will be sowed, wherever the field is, in the maize or in the wheat storey.

3.2 No livestock ownership; creating vulnerability in the farming system

In this situation the farmers production is too low to make a surplus, hence no grain is sold to earn cash. Therefore, no investment can be made in farming activities, and therefore it is impossible for the farmers to start livestock production. Some manage to have few animals, but as the family needs to buy foodstuffs, and manufactured goods, the animals are sold faster than the flock increases.

In this situation, one of the sons is often hired out as a herd-boy and is paid with animals. However the family has insufficient resources to manage the animals, which therefore have to remain in the flock/ herd of the owner hiring the herd-boy, which means that the financial yield is less and cannot provide a cash income for the family.

3.3 Off-farm income: essential to provide the family with cash and food

In order to earn cash to provide the family with the basic needs, the two farm workers must find off-farm activities. The normal solutions are to brew beer, to collect firewood in order to sell it, to make rooves or to work in others' fields. In addition, the women work each time there is a letsema and are paid a basin of wheat grain. A worker receives for one day's weeding M15, while a worker in the letsema (taking 2 to 3 days for the harvest, the threshing and the winnowing) is paid one basin of wheat grain (9 kg), ie about M30. They also receive money from family members living in the cities, but it is too infrequent for it to be relied on it alone.

- Undermining farm work
  Since such farmers spend much time working for others, the time spent on their own fields is reduced. This engenders an even lower grain production because some field work, like weeding or hoeing, cannot be done in a timely fashion. For example, for farmers in the maize storey, about 20 days in November is spent weeding others fields, while the weeding in their own field would need 7 days. The problem is not the work load, because a whole month is sufficient to do both, but it is the fact that their own weeding is done too late (end of November, or even December, according to the stage) and it affects the plant growth (work load of farming system in appendix 10).

3.4 Having oxen in mafisa, a solution but only for a few month a year

Some farmers manage to get oxen through mafisa, so they are able to work in others' field, and thus earn cash or food, or do sepane with an owner of a plough to have his field ploughed earlier. These farmers manage the oxen, and benefit from the the cow dung. However, the oxen are not allowed to stay around the villages during summer time, which is the cropping season. As a result, when draught power is required for field work the borrower has to ask for permission to take the oxen into the village area. This permission never exceeds a week and a half, and during the rest of
the summer the animals are kept in the owner's flock, or in the flock of another farmer (baealisetsana).

Having oxen in mafisa has become rare: one must take care of the oxen (take them to graze etc.) which is time consuming, and some prefer to focus on other income-generating activities like roofing or work in others fields.

4 Subsistence farmers in the process of creating a herd (farming system (3): 20 %)

These families have a situation similar to the subsistence farmers described before. They practise the same crop system, but own animals. They have fields which total about 0.5 ha, and they own about 15 sheep or/and goats that the husband inherited or got when he was a herd-boy.

4.1 Not enough animals to get wool and mohair cash income

Where the smaller farmers have insufficient animals for the flock or herd to be economic, there are two systems by which the smaller owners entrust their animals to a larger owner.

4.1.1 Sheep and goats: entrusting a large owner with them for the full year

Having few sheep and goats is the first step in creating a herd/flock. However the small size of the herd/flock does not allow the owners to earn enough money, and compensate for the production costs (especially medicine and herd-boy's wage). Indeed, the salary of a herd-boy and the medicine and the fees related to the shearing are higher and higher. So 10 small ruminants are not enough to cover the costs them. Therefore the farmers have to entrust a larger owner with their animals, thus losing the cash income from their wool and mohair clips. In this way, the manager is responsible for all the shearing, medicine and reproduction matters, whereas the owners decide about the slaughter, the sales, and when to take their animals back (sketch 12).

The capitalization process is slow and the owners are not often aware of what really happens to their animals when entrusted. Indeed, the large owner (the manager) informs them about the births, deaths or losses, but might sometimes lie about the death or losses and might be taking much less
care of the animals in *mafisa* than of his own ones, thus engendering a low reproduction rate. The owners have no means to verify the information and can only wait for their animals to multiply and be numerous enough to take them back.

The families slaughter about one old male per year when there is a need to buy food (often at the beginning of the year). This allows them to face difficult periods, unlike the families of the previous farming system. However, no more than one animal is slaughtered because it would decimate the herd/flock.

### 4.1.2 Cattle: Entrusting a large owner with it but only part of the year

An alternative system is that of *baelisetsana*. In this system the cattle are placed with the large owner, but only for the summer, and the smaller owner takes them back for the winter. As noted elsewhere, animals are not allowed to stay in the village area during summer.

- **Marking the animals to differentiate them**
  Each owner has a distinctive mark to differentiate his animals. It takes the form of distinctive cuts done on the ears with a knife.

### 4.2 A situation leading to the same difficulties as the other subsistence farmers

As these farmers cannot get money from the wool or mohair, and as the herd/flock is too small to slaughter more animals, they are compelled to find complementary activities to get cash or food. As a result, they also brew beer work in others' fields to weed or for *letsema*. They also receive money from family members living in the cities but it is too infrequent to rely exclusively on it.

### 5 Farmers making a living exclusively with a mixed crop and livestock production (farming system (4): 27 %)

The families practise a mixed crop and livestock production, and rely exclusively on farming activities to make a living. Whereas the crop production can provide the family with food for the whole year, the livestock production, and notably the wool and mohair production, is a source of cash and enables them to buy the basic manufactured goods and school uniforms or pay fees. To make their livestock production durable these farmers have hired two herd-boys, and have developed a forage crop production to feed the herd/flock, in addition to the communal grazing.

### 5.1 The inheritance of a wealthy family, a good start to live exclusively on farming activities

The families inherited one or two fields from the parents and then received another from the chief or the Community Council, thus accumulating about 1.2 ha of arable land. The fields are sufficient to produce maize and wheat and provide the family with food all year long. Every year two fields are devoted to human feeding and one to animal feeding. The fields are not always of the same size and for that reason, rather than crop rotation, farmers decide to devote a field to a certain crop according to the amount of the harvest that they expect.

In the maize storey, the crop system is based on a yearly production of wheat, barley and an intercropping of maize and beans (*Maize+Beans//Wheat//Barley*).

In the wheat storey, the three fields are sown with wheat, barley and a multiple cropping of wheat and peas (*Wheat,Peas//Wheat//Barley*).

Due to people moving down the slope, farmers who have inherited the fields from the parents,
and received one from the chief or the community council, often have their three fields in different locations, and sometimes at some distance from their household. Hence, little crop rotation is conducted and the crops of higher value are always grown on the closest field to avoid thefts.

The family possesses all the tools for the field work including a hillside plough, a harrow and, if needed, a cultivator. Thus all the field operations can be done on time (see the cropping calendar in appendix 5). Moreover, one of the two herd-boys is often required to work in the fields, notably for the ploughing and sowing and for the harvest, of wheat and of maize. The help of the herd-boy is possible because the animals stay exceptionally close to the fields (or help to thresh the wheat) while the work is done. At the ploughing time, the cattle are still on the grazing area C, but for the harvest, they have not yet come back and a permit is asked for to take some of them back for the threshing.

- **The cattle drawn tools (sketch 13)**

  The hillside plough (1) has a ploughshare that can tip up so as to allow round trip ploughing.

  The cultivator (2) is a farm implement that has metal teeth for breaking up the soil used to remove weeds.

  The triangular harrow (3) has a triangular shape frame to which the tines are attached. Weight can be added on top of the frame for deeper penetration.

- **5.2 A CROP PRODUCTION THAT PERMITS FEEDING THE FAMILY**

  - **5.2.1 Cropping in the maize storey, more labour intensive than in the wheat storey**

    - **5.2.1.1 The maize and the beans, a mechanized crop management sequence**

      Only men do the sowing. Three persons are required; one holds the oxen, another holds the plough and the last man throws the mixed seeds of maize and beans in one furrow of two. The team is often a system of Sepane to allow a fast ploughing and to help one another. As the team opens a new furrow, it closes the previous one so as to cover the seeds. According to both the thinness of the soils and the type of plough, the tillage is superficial: it reaches 15 cm depth. Five days are required for a trio of men to sow one hectare of maize. The work starts early in the morning at 7 a.m and it continues up to 2 or 3 p.m and the whole afternoon is free to let the oxen graze.

      The crop management sequence is closely linked with the growth stage of the crop as described on the sketch 14 below.

      ![Sketch 14: Correspondence between the growth stages of the maize and its agricultural practices](image)

      ![Sketch 13: Cattle drawn tools](image)
Since the families own a plough and animals, the maize and the beans can be sown at the beginning of the vegetation season in September.

Harrowing starts in October. As for many other practices, it requires animal traction and is a male job. From that moment the maize must have reached the 2-leaves stage. Indeed before harrowing farmers wait to see if a second sowing is required. Harrowing is done in order to provide better soil condition for the young plants' growth. For harrowing, only two persons are required to guide a team of oxen and hold the harrow.

The removing of \textit{Lechuchuta} is crucial before the maize stalk reaches 45-50 cm which corresponds to the 5 or 6 leaves stage, otherwise the yield is severely lowered. The first weeding is done manually by women in November, with the handle hoe. No mechanised tools can be used otherwise the small and fragile plants of maize (and beans if mixed cropping) are easily removed. As handle hoeing is time consuming and exhausting, a person is hired to weed the field.

The second weeding, in January, by animal traction, before the maize is too high for tillage, is done with the cultivator. It enables the removal of the already high and string weeds easily and quickly, thus avoiding the time-consuming manual activity.

As rain is scarce, ridge tillage is done so as to dig furrows to retain water. This practice plays an important role in lowering soil erosion as it limits the run-off. Men do it in January or February with a plough pulled by a pair of oxen.

When the maize is harvested, both the ears and the stalks are collected. The stover is used for cattle feeding. If the field is close to the river, where the air is more moist, the farmer cuts the whole plant and lets it dry in heaps of fifty or so. This helps to protect the grains from rotting. In that way only the external part of the heap is subject to frost. This practice has proven to be relevant to protect the grain. Nevertheless the inner part of the heap remains humid and the stalks are often partially rotten. This leads to a decrease of the forage nutrition value. Then, when it is dry in June/July, ears are separated from the plant, the covers are removed and they are carried back home in bags of 80 kg on a donkeys' back. Later the stalks are collected using an ox-sledge. Then the ears are stored in the house while the stalks are fenced outside or in a granary.

The harvest is seldom done in \textit{Letsema}, but more often by the members of the family. In \textit{Letsema}, to beat the maize and to sort the grains from the pieces of cob, for a harvest of 5 bags of 80 kg, it would take one day.

About 10 bags of grain is harvested per hectare.

The bean harvest is mainly done by the family or by the herd-boy. Sometimes somebody is hired to do it because this task is difficult due to the itchy Khaki grass seeds (\textit{Lechuchuta}). The vegetative part is sometimes kept and given to the cattle.

\textbf{5.2.1.2 Wheat cropping, a crop management sequence similar to the one in the wheat storey}

Since the families has more than two fields, they can afford to plant a field of wheat. In the maize storey, as the wild oat does not affect the crop production, no first tillage is required after the previous harvest. In addition, due to the difference of temperature between the maize and the wheat storey, the wheat harvest can be done one month earlier. The wheat crop management sequence is the same as described earlier in the part 3.1.2.

(see appendix 5 for the cropping calendar)

\textbf{5.2.1.3 Barley, a forage crop that has become essential}

(see appendix 5 for the cropping calendar)
One of the three fields is devoted every year to supplementary feeding for the sheep and goats. In addition to the production of grain, stalks and also standing forage are produced. The reason for this is that the communal grazinglands have become of poor condition which undermines the wool and mohair production.

The production of barley is done with minimum tillage, as it does not require as much care as the wheat and maize production, which are essential to human consumption. Indeed, after all the other crops have been sown, the barley is sown in December. No previous tillage is required, except in the wheat storey because of the weed pressure. Barley is broadcast sown, immediately followed by a ploughing in. Some farmers send their herd-boy to remove manually the weeds, whereas some farmers do not weed. Because of the shortness of the barley life cycle (4 months), it is harvested in March before the wheat and maize are harvested. As for wheat, the whole plants are cut first and brought together in a heap. The following day, the threshing is done, and then the stalks are brought home. Although there is no winnowing, unlike wheat, it is also labour intensive. Not only the owner and his herd-boy do the harvest but also the farmers who have entrusted him with their animals.

If they have time, farmers do a second cycle of barley once they have harvested. It depends on the time taken to harvest the crops devoted to the family feeding. Then because of the cold the barley never completes its life cycle but it is grazed from May to July by the animals of the owner of the field that have a grazing permit.

5.2.2 The crop system in the wheat storey, less labour intensive and more remunerative

5.2.2.1 Wheat and peas as staple food crops

The peas are always sown in the closest field from the house, in order to avoid green peas theft, and are rotated in the field from one parcel to another. Wheat and barley are sown in the farthest fields. Since no specific tool except the plough is required, the agricultural practices are the same as for the subsistence farmers, but the ploughing can be done earlier.

A first tillage is done in May or June and the wheat and peas are sown in September and October. It requires a plough, a 2 or 4 oxen team and two persons. Farmers practice broadcast sowing and immediately do a ploughing in. A 5-day period is necessary to sow one hectare and is done by men: the owner, helped by another farmer.

The weeding and the harvesting are then done manually as explained earlier in the part 3.1.2 for the farming system (2).

5.2.2.2 Barley for animals feeding purpose

As in the maize storey, cropping of barley has become necessary due to the poor pasture condition and the rise in the wool and mohair quality standards. The crop management sequence is almost the same as down in the maize storey (see part 5.2.1.3) except that a previous ploughing is required to lower the weed pressure, and that no second crop cycle is possible, due to the colder conditions.

5.2.3 Having cattle enables access to supplementary fields

Since the farmers have to produce supplementary food for the livestock there is one field less devoted to the production of the staple food crops. Furthermore a hundred years of continuous single cropping combined with severe soil erosion has severely affected the yields. Thus there is a need to increase the number of fields to compensate for that loss.

Cattle and drawn tools ownership allows the farmers to have access to more fields. While there is
only a little space to create new fields, numerous farmers who have no means of tilling their fields as they have no tools need to do share-cropping in order to have their fields tilled. So farmers who own cattle and tools have access to crop shared fields and therefore to supplementary feed.

Such an arrangement concerns only food crops and particularly wheat. Indeed the farmers who share-crop-in are not interested in forage crops, but in food crops. Furthermore farmers do not share-crop with maize, the reasons seem to be that it is more time consuming and the yield is far too low once each farmer gets his share.

5.3 MULTIPURPOSE CATTLE, WOOL SHEEP AND MOHAIR GOATS: THE WEALTH OF THE FAMILY

5.3.1 SHEEP AND GOATS FOR WOOL AND MOHAIR PRODUCTION

5.3.1.1 Wool and mohair: the main source of cash income

Both Merino sheep and Angora goats are raised for fibres production. Farmers have 70 or so sheep and fewer goats. The animals are sheared once a year: the sheep from October to December, and the goats in April and May.

The owners are members of the Wool and Mohair Grower Association (WMGA) of Makhapung, which provides them with advice from the Livestock Produce Marketing Services and allows them to have access to improved rams and to shear at the government wool shed (see section access to markets)

Despite the lower cash income generated per goat compared with sheep, goats are as important as sheep. Indeed, since the shearing seasons are different, it makes possible two payments a year, rather than only one; to have both productions is an insurance if wool, or mohair prices, suddenly fall. And the goats can be sold to South African hawkers who then sell the animal in Kwazulu Natal province.

5.3.1.2 Breeding management

The rams and billy goats are bought from South Africa for their high production potential, both in term of reproductive efficiency and fibres production. For security reason farmers have two rams and two billy goats that are kept 2 years. After that they are exchanged with the ones of another farmer so as to avoid inbreeding. For that reason, the males are bought only once every 4 years. However, sometimes farmers do not buy improved rams or billy goats but keep the male descendants that have a fine quality to be the next breeding animals, thus limiting the production costs.

In order to avoid cross breeding, the males are castrated with the Burdizzo tool before the age of 6 months which is the age of the sexual maturity. The females reach their sexual maturity at 14 months. Thus, the ewes who were born in the spring are bred at an age of 16 months during the summer mating, and the ones who were born in winter are bred at an age of 14 months during the winter mating.

There are two mating periods for the sheep, in spring and in winter, so as split the lambing into two periods. This lowers the lambing work-load in spring when the planting season requires all the farm workers, and it permits a reduction in the risks of losses, which may result indirectly from drought in spring, or snow in winter.

It is the herd-boy who mainly takes care of the ewes during lambing. In summer the mating period is organised with half of the breeding ewes, which leads to a winter lambing. A second mating period is conducted in winter with the other half plus the non-pregnant ewes, and the
lambing takes place in spring. There are no twin lambs and a maximum of one lamb per ewe per year. The 6-year old ewes are left apart from the flock during the mating period because they would die during lambing.

Unlike the sheep, the goats are mated only once a year and give birth to one kid. Furthermore they are more fragile, so the kidding is done at home and both the herd-boy and the farmer take care of the pregnant goats. The goat mating period is organised in April for the kidding to happen in spring when the grass is abundant and the goats well fed.

5.3.1.3 Medical care

The fact that the animals are raised outside year-round requires special care. In particular, the farmers treat their stock for internal parasites that the animals eat when grazing, and against enterotoxemia. Both diseases weaken the animals, and can cause a loss of production and even death. The treatment calendar appears in the table 6 below.

Table 6: Livestock medicine calendar

<table>
<thead>
<tr>
<th>Anti-parasites and infectious diseases</th>
<th>Species</th>
<th>Treatments frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Scab</td>
<td>Sheep, goats</td>
<td>2x/year, Jan-Aug: all animals</td>
</tr>
<tr>
<td>-Enterotoxemia</td>
<td>Sheep, goats, cattle</td>
<td>2x/year, Dec-June; Adults only</td>
</tr>
<tr>
<td>-Internal parasites (tape worms)</td>
<td>Cattle, sheep, goats</td>
<td>2x/year, May-Nov; All animals</td>
</tr>
</tbody>
</table>

The internal parasites are mainly worms, against which all animals are treated when leaving a grazing area: in November for the transhumance and in May for the reverse transhumance. The treatment is important otherwise the animals get weaker. It consists of an injection done by the farmers themselves with the help of their herd-boy. In the absence of a clear understanding of the internal parasites life cycle there is a trend towards over treating the animals, which is no use and costly. The farmers buy the syringes in town but the medicine is more difficult to obtain as it is often necessary to get it in South Africa.

Concerning enterotoxemia the treatment also consists of two injections a year but only adults are treated.

In addition, there is a national campaign to fight against the infectious scab disease, that affects sheep and goats and causes the wool and mohair to break, and causes the death of the youth. The farmers are visited twice a year, in the valley, by the LPMS employees who treat the animals.

5.3.2 The multi-purpose cattle

Cattle is the wealth of the family since it provides draught power, fuel, milk and meat and is even used for the bride price. The size of the herd is about 25, comprising 16 males, both calves and adults, and 6 reproductive females. The cattle are mainly the indigenous Sotho cattle, which are hardy. All the animals are kept until they are too old to produce or to do the tilling at about 12 years old or so. The males can be sold younger from the age of 8 years according to the need of the family.

The cattle are preferentially kept in the village area where one herd-boy is in charge of the daily work. It starts early in the morning with the hand milking of the nursing cows, that are not more than 3 to 4 animals. Then all the cattle are taken to graze on the surrounding pastures from 8 am to 4 pm, with a watering on the way. The herd-boy drives the animals onto the authorized areas where the grass is abundant, and he makes sure that no animals graze in the fields.
Every night the calves are penned separately from their mothers for the family to have milk in the morning. To milk the cows, the herd-boy must attach the calf to its mother, otherwise he will not be able to milk the mother. Only 2 of 4 of the teats are milked, leaving the other two for the calf.

The male calves are castrated at the age of 2, with the Burdizzo tool, before they reach sexual maturity. Only one is kept as a bull for reproduction, and he will be replaced at the age of eight. Among the oxen 2 to 4 are trained for the tilling.

5.3.3 Livestock Production: A Life-long Project

Unless farmers can buy animals, or inherit some from their parents, livestock production is a long term project. Hence numerous farmers fail in their attempt to create a herd/flock, and to make it profitable. Two of the most important reasons why it takes so long, are the low capacity to invest, and also the livestock farming practices.

5.3.3.1 Sheep and goats: a long start

Although sheep and goats have a fecundity rate higher than 80% in Matsoaing which means that a female provide the farmers with a lamb/kid 4 years on 5, the increase of the stock number is quite slow during the first years of this farming activity. The reason for this why is that farmers can only afford one or two females (no males because they do not give a progeny), and these are entrusted to a larger owner.

5.3.3.2 Cattle: a long calving interval

The weaning of the calves takes a long time; almost 2 to 3 years, and therefore there is a very long calving interval: 24 months on average. For this reason it takes almost a lifetime to create a herd of 25 cattle, thus lowering the farmers' ability to develop marketable animal produce.

In order to wean the calves, farmers sometimes separate the mother from its calf for several months, with the mother kept with the sheep and the goats. But this has proven to be inefficient as the cow escapes to find its progeny. A second practice consists of smearing the teats every day with cow dung, which can work.

5.3.3.3 An unsafe project

Livestock farming activities are quite risky. Indeed, because of climatic hazards such as the possibility of a snow disaster, almost all the stock could be decimated, and all farmers are at risk of stock theft. For that reason farmers are likely to keep their animals close to home despite the fact that it is contrary to the grazing schedule. For example, the cattle should reverse transhume to pastures C in July once the harvest is finished, but farmers bring them back in May or June for fear of cold disaster in the A and B grazing areas.

5.3.4 A Livestock Management System in Two Animal Units

Because of the grazingland regulations, it has been decided that some of the animals have to stay away from the village in the A and B pastures, whereas some can stay all year long in the C pastures (grazing permit). As a result, farmers have divided their stock into two animal units, and each of them requires a herd-boy.

Due to the pasture regulations, the sheep and the goats stay away from the village all year long whereas some of the multi-purpose cattle stay home: they provide draught power and milk. Furthermore, both for fear of theft and to manage the reproduction, the billy goats and the rams are also kept with the cattle, except during the mating periods when they join the sheep and the goats in
the 2nd animal unit (see sketch 15).

The animal units are not separated: animals switch from one to the other. Indeed cattle stay in the village area during winter and spring (from June until the end of December) while it is cold on the upper pastures. During the cropping season (from October to June) the cattle transhumce, except 3 nursing cows and their calves. They provide milk for the family and have a the grazing permit. In addition 2 or 4 oxen stay temporarily for the tillage.

For each mating period the reproductive males leave the village to join the breeding ewes or the breeding goats. This happens in January and May-June, for the summer and winter mating of the sheep, and in April-May for the autumn mating of the goats. Furthermore because of the cold, the winter lambing takes place at home. All the pregnant ewes are taken back to the village in May and stay there with their lambs until the spring.

The pregnant goats are also taken back to kid in the village, where they remain with their kid during the spring.

5.3.5 Nursing animals: supplementary feed

Although the feeding of the animals is provided by communal pastures, farmers have to supplementally feed part of the stock, both to face the shortage of grass in winter, and to maintain livestock productivity; notably the yield and quality of wool and mohair. Sketch 16 illustrates the livestock feeding schedule, which is described below.
As it has been explained, there are two animal units. The one that stays in the village relies on the grazing areas surrounding the village (particularly the maboella), and on crop residues during the common grazing (pastures C). The second unit transhumes from B to A pastures with animals passing from one unit to another. During winter and in the early spring (from to June to October) the grass is scarce on pasture C. For that reason, before they are taken to graze with the rest of the herd, the weaker cattle are fed every morning with the stover and the straws of barley which were collected during the harvest. There is no calving in winter so only the 2-year nursing cows and the pregnant cows need to be fed. Indeed, although the bull is with the cows all year long, there is a calving period that occurs in spring which corresponds to the maximum availability of grass. Accordingly, that years nursing-cows, despite the fact that they do not transhume, have enough grass.

As far as the sheep and goats are concerned, the important issue for the farmers is the success of the mating in order to have a high reproductive efficiency, and a high quality and yield of wool and mohair. That is why both rams and billy goats are supplementally fed daily with bought concentrates\(^1\) and grains of barley for 2 months before the mating period. Moreover, before the winter mating, the rams graze the standing forage (second cycle of barley) in May. Furthermore despite the fact that only the reproductive males stay in the village area most of the year, pregnant sheep and goats are taken back to the village for the winter lambing and spring kidding. There they are given daily concentrates and grains of barley before they are taken to graze.

Finally all animals are given salt lick once a week to avoid mineral deficiency.

\(^1\) Bags of 25 or 50 kg of concentrates bought in Mokhotlong a the Lesotho Farm Feeds
5.3.6 Selling the Animals and their Produce: When Needed but Not When it is Profitable

As the animals are a form of saving, farmers have no immediately commercial incentive to develop livestock for sale. That is to say that they primarily sell their animals when there is a need, and not when it can bring in a good price. On average 14 goats, the same number sheep and one cow/oxen are exploited per year. Of this, 12 sheep or goats are given each year to each of the two herd-boys as a salary. Nevertheless farmers are more willing to pay their herd-boys with cash rather than with animals, because the herd-boys want to be paid with female, rather than with male stock. About 4 sheep or goats, and a cow, are necessary to satisfy the needs of the family.

The exploited animals are preferentially the old males of 7 to 8 years or so. The oxen are sold first, then the goats and the sheep. The sheep and the goats can even be kept until they die because even when old, farmers can still benefit from their clips. At that age, the sheep and the goats are called «gummy» or «broken mouth» as they have no more teeth to graze; they look old and their meat is so hard that it requires almost 4 to 5 hours of cooking. For that reason, they do not have much value when sold. The same happens with the cattle: old oxen are preferentially sold.

Due to this the herd of cattle comprises non productive animals, including on average approximately eight oxen, whereas only 2 or 4 are required for draught power. Whilst uncommercial in immediately economic terms, this strategy nevertheless provides «security», and as a result there is a motivation for farmers to simply increase their stock levels.

6 A large-scale farmer of beef cattle and meat sheep (farming system (5))

This farmer is alone, but has a technical education and worked at the Ministry of Agriculture.

In the valley one farmer raises his animals in a different way. Compared to the other farmers he uses a market oriented production, which means a different, more technical, management of the stock. Rather than multi-purpose cattle, the animals are devoted to beef production. The sheep are raised first for meat production and their fibre production is of secondary importance.

In order to sell his production, this farmer has recourse not only to his own butchery in Mokhotlong, but also to auctions that occur in South Africa, in Underberg. The stock is composed of 400 Nguni cattle and 1.700 mutton Merino sheep.

The feeding of the stock also relies on communal land and the animals are taken to graze by 8 herd-boys. Virtually one herd-boy could manage almost 1.000 head (according to the farmer) but, in order to avoid stock theft and the grazing of the animals in the fields, he employs a ratio of one herd-boy to 250 animals.

Because of his high stock numbers, the farmer is believed to be responsible the problem of overgrazing.

6.1 Beef Cattle Production: Maximising Productivity

The herd of cattle is managed in a way that the stock number is constant: almost 400 head of cattle, which permits annual sales of 110 head. Actually there is no market for more. Each year, all the 3-year beef steers are sold. The reproductive females are sold and replaced at the age of 5 years and a half. (see sketch 17)

An important condition of selling the animals at a good price is a good body condition. That is the reason why the animals are supplemented daily with concentrates and stover. And also because only well fed cows would enable the farmer to get a high conception rate, which reaches 80 %. This
means that a cow gives birth to 4 calves in 5 years. Supplementally feeding the heifers also lowers the age of sexual maturity.

This type of management tends to maximise the livestock performances. Nutrition is a crucial issue but also a high cost of production. As a result the animals are sold at a younger age.

Another important aspect is to minimise the calving interval. For that reason the calves are separated from their mother at the age of 4 months for a quick return of the oestrus and subsequent mating. In practice the calves are taken from the animal unit 1 to animal unit 2 for a couple of weeks, and both cow and calves are watched over (since this farmer follows the same grazing calendar, he also manages the stock in two animal units. See part 5.3.4 for animal unit explanation). In addition to this the barren heifers are sold.

A high importance is also accorded to the management of reproduction. Two bulls are put with the herd from November to January. This encompasses a calving period in spring from August to October, when the grass is abundant, to feed the nursing cows. The bulls are bought in South Africa at the age of 3 and are kept for 2 years.

The grazing calendar for the cattle is the same as described in section Human footprint in Matsoaing area, part 4.3.2. But a particularity of this livestock management is that the animals graze at night. According to the farmer, night feeding is well adapted to the rhythm of the animals: graze at night when it is colder, subsequent digestion causes warmth, and during the day rest close to a water spring.

During the common grazing, because the cattle are numerous, they consume an important part of the crop residues in the valley, and the other livestock owners think it is unfair.

**LFSS: Functioning pattern of a herd of beef cattle**

- Culling rate 38%
- Culling age 5.5 years old
- Replacement rate 25%
- Replacement rate 39%
- Conception rate = 80%
- Calving-interval = 15 months
- Died 2
- 2-3 years: 59
- 1-2 years: 59
- 0-1 year: 120
- Sold 57

**Composition of a herd of cattle of the Malutis Beef cattle**

- Reproductive females: 150
- Heifers: 108
- Suckler cows: 120
- Males: male calves, adults: 179

**Herd 388**

- Stock numbers: 388
  - (Cows + Bulls + Beef steers + Heifers) (1)
- Herd exploitation: 29%
  - (Sold / (1))
- Death rates:
  - Adults (females >3 years + 2-3 years old males) 2%
  - Calves (<1 year) 2%
  - (number of death / size of age group)

**Sketch 17: Functioning pattern of a herd of beef cattle**
6.2 Meat Sheep, an emphasis on quality

There are several differences in mutton sheep farming management compared to wool sheep farming management. Firstly the sheep are raised for the meat (they are sheared but there is no emphasis on improving the fibre quality). So the sheep are sold younger while they still have a good body condition. Secondly, there is no transhumance but the animals stay all year long on the A pastures.

The flock is composed of about 1700 mutton Merino, among which 1000 breeding ewes. These ewes are sold at the age of 4 years which means that approximately one third is sold per year. As many males are sold every year. However the males are sold at the age of 3, which lowers the cost of supplementary food.

Every day the flock is taken to graze by the herd-boys, who also give supplementary food. The concentrates come from RSA, as well as the licking salt which is distributed once a week. Due to the high stock number, there is no night paddocking but the herd-boy do their rounds several times a night to keep the jackals away and to protect the stock from the theft.

There are also two lambing periods, in October and May. Both lambings are done in the A pastures as the animals never move from this grazing area. 18 rams are used for the mating and are replaced every 2 years. Except during the matings, the rams stay all year long within the village animal unit.

The shearing is not done in a national shed but in a private one, ruled by few large-scale farmers. They also organise their own scab vaccination campaign.

6.3 A broader access to markets: a private butchery and the South African auctions

Compared to the farmers practising a mixed crop and livestock production, who have only little access to market, this farmer has his own butchery in town. All the sheep are sold in Mokhotlong but the cattle are also sold in auctions in RSA. Whether the meat is sold in the butchery or in the auctions, the farmer waits for good prices. Every month he attends the auctions in Underberg to check on the evolution of prices.

7 Farming systems: all linked by goods and services exchanges

Not only all the farming systems described earlier rely on a common use of natural resources but they are also closely linked in the form of exchanges of goods and services. As illustrated on the sketch 18 there are three main kind of relations between the farming systems: mutual aid, livestock loan and remunerated work.

All kind of farmers are compelled to rely on each others for certain tasks, like the harvest of the wheat for example (Letsema). Indeed certain activities require mutual aid because their work load is higher than what the family can provide.

Some other field works are subjected to remunerated work, notably when it requires draught power and cattle drawn tools that only few possess. Only the farmers belonging to the farming system (4) can provide oxen and tools, and they till all the fields of the valley.

In addition to this, almost two thirds of the families are structurally dependent on off-farm activities. Such families work seasonally for the farmers practising mixed crop and livestock production. They do the weeding, contribute to the harvest of maize for food or for money. But the
families of the farming systems (1) to (3) also provide the wealthier with herd-boys. The salary that the herd-boys get enables them to settle with a family. In that way the farmers practising mixed crop and livestock contribute to create local employment. Furthermore through the system of *mafisa* and *baealisetsana* they enable some families (represented in the farming system (3)) to create a herd/flock.

On the other hand, the farming system (4) requires more fields as farmers produce both food and forage crops. For that reason, those farmers often do share-cropping-out with the ones that have no cattle to till their fields. Farmers of the farming system (1) are little engaged in share-cropping as they have no or only very little fields.

However being compelled to rely on off-farming activities undermines the development of the farm. As a matter of fact, numerous farmers are engaged in time consuming jobs for other families. For example the manual weeding of maize in November takes 20 days per hectare and must be done on time or it severely affects the yield. So there is a conflict between weeding for others and getting paid for it or weeding for oneself and avoid the yield to decrease.

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**Sketch 18: Interrelations between the farming systems**

**Legend**
- Mutual aid: - Letsema - Sepane
- Livestock on loan: - Mafisa - Baealisetsana
- Workforce: - Herd-boy - Seasonal worker - Tilling
- Share-cropping

**Remark:** the large-scale farmer is not represented on this sketch as he is only little engaged with other farmers. He only hires few herd-boys and buy little forage per year.
TECHNICAL AND ECONOMIC PERFORMANCES OF MATSOAING AGRICULTURE

An economic assessment of the crop systems and livestock farming systems enables one to compare their technical performance (calculations in appendix 13). Furthermore, the determination of the income generated from each farming system highlights the constraints for the farmers, the viability of their activities and their capability of reaching, or not, the survival threshold. The calculations are based on a normal year, and on the information given by farmers about their production and income (calculations in appendix 14). These results highlight the trends of the wealth generated by the farming systems in the Matsoaing area. The economic indicators used are detailed in appendix 11.

1 Productivity of the crop and livestock farming systems

1.1 CROPPING: WHEAT, A HIGHER PRODUCTIVITY OF LAND AND LABOUR

In diagram 2 the land productivity of each crop system is illustrated, that is to say, the wealth generated per hectare. The productivity of the land of the different crop systems is rather low with a maximum of M6.100 per hectare due to the small harvest. Indeed, poor agricultural practices have progressively led to both soil and yield erosion.

Since the yield for maize is 2.5 times lower than the one for wheat, crop systems 1 and 2 are of lower productivity. The maize is intercropped with beans, which has only a little influence on the yield for maize. In addition, the price per kilogramme is lower for maize (M3.1/kg) than for wheat (M3.5/kg). Furthermore, since maize is a row crop, the cropping of maize every year leads to severe erosion and soil exhaustion.

Thus, the farming systems in the wheat storey create more wealth per hectare than the ones in the maize storey. Furthermore, wheat has the highest yielding potential of the field crops cultivated in the Matsoaing area. Consequently, the crop system (3) generates more wealth per hectare.

The productivity of crop systems 2 and 4 falls between the other two due to the cropping of
barley: it yields less than the wheat and the second sowing leads only to a standing forage, whose value is lower than a full harvest of grains.

In diagram 3 it is highlighted that the productivity of labour, which represents the wealth created per working day, for the crop systems including wheat is higher than for the system excluding wheat. Indeed, crop system (3), based on a multiple cropping of wheat and peas, has a work productivity of almost M55 per man.day, which is almost twice the productivity of labour of crop system (1). The reason for this disparity is that unlike maize, wheat requires only little labour, except for the harvest, and only a short weeding is made between the sowing and the harvesting time. Furthermore, the wheat yields more. On the contrary, crop system (1) has the lowest productivity because it is labour intensive, with field work during the entire growing season to weed or till. Crop system (2), although including barley and wheat, still requires much labour due to the cropping of maize.

Consequently, the crop systems in the wheat storey exhibit higher productivity both for land and work. Moreover, these systems often engender less erosion than the ones in the maize storey because the soil is better covered.

1.2 Livestock keeping: Meat production, a higher profit

*The calculation is based on the total stock number, it does not include the births of the year

Diagram 4: Productivity of the livestock farming systems
Diagram 4 illustrates the wealth generated per animal for each livestock farming system. Because of the difference of value of the animals, it does not make sense to make a comparison between cows, sheep and goats. But it is possible to compare the animals within the same category, which is illustrated by the dotted lines in diagram 4. The meat sheep create about twice as much wealth as the wool sheep with a wool sheep bringing in M140 a year and a meat sheep about M260 a year. The private butchery enables the farmer to sell the sheep at a better price (M900 for 3-years old sheep, compared to M600 for the other farmers). Moreover, the wool sheep are sold old (8-years old), thus reducing their value. Furthermore, the longer the animals are kept, the more the owner spends for the medicine and the supplementary food. And the wool Merino is more sensitive to disease than mutton Merino, and therefore the cost for medicine is higher.

Mohair goats generate less wealth than wool sheep. Indeed, livestock owners give the same quantity of medicine and fodder to sheep and goats, hence the same expenses. But the income per animal is lower per goat (M47/year per animal for the mohair, M400/animal sold), than per sheep (M90 for the wool and M600/animal sold). Hence, productivity per goat is two times lower. However, because of the small animal size, the medicine given to the goats should be less. But most of the time, the indication on the box is in English: and with a few farmers reading, understanding English, in general the animals are over-medicated.

Beef cattle (LFS5) generate the most wealth. This is permitted by the sales via the private butchery and the fact that the animals are sold through auctions when the price is satisfactory. On the contrary, the multi-purpose cattle are sold old, to a butchery as well, but the farmers do not benefit from the added value created when sold as meat to the consumers.

2 The majority of farmers below the survival threshold

Agricultural income is calculated on the basis of a year without climatic disaster (drought, snow). Indeed, disasters leading to a large loss of the harvest or of the flock/herd (deaths or obligation to sell the animals to compensate the low grain production) are exceptional. The calculation of incomes has been made for both storeys for most of the farming systems, to highlight the differences between maize and wheat cropping. Indeed, wheat yields more than maize and so generates a higher subsistence income. However, the farming system (1) occurs only in the lower storey, hence the calculation has been made for cropping of maize and beans only.

To highlight the viability of each farming system, a survival threshold was determined by asking the poorest families about the basic needs (food and clothes) for a year (appendix 12). This threshold indicates the minimum needs for a family of 6 persons (a normal family is constituted of two farm workers, three children and one adult dependent) to live, and to be able to reproduce the human capital involved in a farming system. This threshold is of M2,978 per year and per active farm worker.

In diagram 5 the agricultural incomes generated per year by the different farming systems are shown. Since farming system (5) is far above the survival threshold, with an income of M725,000 per year, it has been chosen to focus on the other Farming Systems (FS) only.

Furthermore, to highlight the importance of livestock production in agricultural income, the contribution of both crop and livestock production is illustrated.

Diagram 5 clearly shows that only the livestock owners (FS4) who are able to manage their animals are above the survival threshold. However, compared to the wealth created by crop production, livestock production does not bring in as much as one would expect, because of the high costs of production (two herd-boys almost cost M10,000 per year).
Income generated by livestock production for farming system (3) does not allow these families to reach the survival threshold. Indeed the income comes from the sale of one animal per year but not from the wool and mohair. Furthermore, for all the families whose agricultural income does not reach the survival threshold, having off-farm activities is of importance, as shown in diagram 6.

It is only with off-farm activities that the farmers of FS1 reach the survival threshold. Indeed these families are in the process of leaving agriculture, the woman works as a seasonal worker, whereas her husband is a migrant worker. The farmers of FS2 and FS3 are differently positioned. Despite the fact that they are also compelled to rely on off-farm activities, their principal activity remains farming, but they remain at risk to migration to off-farm activities. These families have no cash income from wool and mohair, and the subsistence income from crop production is not sufficient to reach the survival threshold. However due to the work load on their farm, they cannot do more off-farm activities. Ultimately, if they cannot make a living from agriculture they may well follow the strategy of the farmers of FS1.
An analysis of agricultural incomes highlights the importance of livestock production. Three categories can be discerned:

- Farmers who are always below the survival threshold (without livestock production)
- Farmers above the threshold (thanks to livestock production)
- One farmer generating an exceptional income with meat production

**Farmers always below the survival threshold**

As indicated in diagrams 5 and 6, the only farming activity is crop production, which generates a subsistence income too low to reach the survival threshold. Even during a very favourable year which would engender yields twice as high, the crop production could not provide the family with the minimum income. The two farm workers have other activities to compensate this lack of grain production and the absence of income-generating farming activities.

Some families own few animals (FS3), but as they are given in *mafisa*, they generate only a little income per year. But despite this, small livestock owners hope to be able to manage their flock/ herd one day to be wool and mohair growers. However, because it is a costly production, it has been estimated that at least 16 years are necessary, for a farmer who starts from one ewe and one goat, to create a flock/ herd and make a profit (*sketch 19*), provided that the first ewe/goat does not die and that there is no climatic disaster or theft.

Since the family needs cash to buy manufactured goods (candle, matches, pots etc.) and the food they cannot produce, off-farm activities are necessary. The income generated by these activities counts for between a third and a half of the total income of the household (FS2 and FS3). But despite its importance to the families, it does not enable them to reach the survival threshold and are compelled to rely on mutual aid.

Consequently, these families are very vulnerable and suffer from a food shortage every year. The need for new cash income-generating farming activities, demanding low investment, is high, to allow the family to live only on their own farming activities.

What is more, the families in the process of leaving agriculture (FS1) cannot live from farming activities. Their fragile situation, when waiting for migrant remittances, causes them to fall below the survival threshold if the head of the households does not come back.

**Farmers above the survival threshold thanks to livestock production**

Farmers having both crop and livestock production can have an agricultural income above the survival threshold. The animal husbandry permits them to earn cash through the wool and mohair production, as well as from the sales of live animals. But the production is costly, so the cash income generated by the wool and mohair production is not as high as one would expect.

The ownership of oxen and tools permits better work productivity and higher crop production. As a result, crop production is as valuable as livestock production.

However, in the case of stock theft or climatic disaster, a loss of the major part of the flock, or the harvest, can cause them to fall below the survival threshold.

**One farmer generating an exceptional income with meat production**

This farmer generates an exceptional level of income from livestock production for meat purposes, and has direct sales through his own private butchery. This farming system requires several employees: two to run the butchery and eight to herd the animals. Thus it necessitates a large investment and a secured self-owned outlet for the meat.
Sketch 19: Assessment of the profitable threshold for wool and mohair production

<table>
<thead>
<tr>
<th>Expenses</th>
<th>Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herdboy (wage + feeding)</td>
<td>Wool M 90,0 per sheep</td>
</tr>
<tr>
<td>+ Medicine</td>
<td>Mohair M 47,0 per goat</td>
</tr>
<tr>
<td>+ Supplementation</td>
<td>Sales M 600,0 per sheep</td>
</tr>
<tr>
<td>+ Wool &amp; mohair growers</td>
<td>M 40,0 per sheep</td>
</tr>
<tr>
<td>association fee</td>
<td>M 400,0 per goat</td>
</tr>
<tr>
<td>+ Others</td>
<td></td>
</tr>
</tbody>
</table>

The table illustrates the yearly expenses and income of wool and mohair production. This activity requires a high level of investment, notably to supply for regular costs; of which the herdboy salary is the highest. Only a large size animal herder can make it profitable.

Wool and mohair production requires at least about **thirty animals** to reach the profitability threshold: **16 years** or so are necessary for a farmer with only one ewe and one female goat, and who relies only on natural increase. Those data have been calculated for a mixed flock of half sheep, half goats. The natural increase as well as the age of saling are based on field data.
ACCESS TO MARKETS CENTERED UPON WOOL AND MOHAIR

1 Little access to monetary economy

A brief reminder of the three stages of economy highlighted by Fernand Braudel (quoted by Bergeret, 2002) provides an interesting key entry for the understanding of Matsoaing’s farmers’ marketing opportunities.

According to Braudel, economy is a three-level system:

- the first level of “domestic sphere” is one of non-monetary and informal exchanges, on-farm consumption, and barter. It occurs with families or in a restraint area.
- the level of “ordinary economy” (or market economy), is the level of monetary exchanges at short distances, with competition and with a certain transparency of transactions. The evolution of prices is well known and works within the market laws of supply and demand\(^1\). The level of “domestic exchanges” connects with the “ordinary economy” through the purchase of foodstuffs, manufactured goods and services, employment or independent work and sometimes direct sales of production surplus.
- The level of “capitalism” is the last one. This level is developed only if the economy can go beyond market laws and take advantage of monopolistic situations: the transactions are opaque and there is a strong relationship with the State. This level is only accessible to the operators who are linked with political power, and who are financially strong.

In the Matsoaing area, the majority of farmers are in the sphere of domestic exchanges and barter, and only few of them have access to the ordinary economy (table 7). Indeed, access to the local market is limited and the shops in Mokhotlong are supplied mainly with South African products.

<table>
<thead>
<tr>
<th>Production</th>
<th>Domestic economy</th>
<th>Local market</th>
<th>National market</th>
<th>International market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsistence crop</td>
<td>+++</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit and vegetable</td>
<td>+++</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>crops</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat:</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Cattle</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Sheep</td>
<td>++</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goats</td>
<td>++</td>
<td></td>
<td></td>
<td>+(1)</td>
</tr>
<tr>
<td>poultry</td>
<td>+++</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wool and mohair</td>
<td></td>
<td></td>
<td></td>
<td>+++</td>
</tr>
</tbody>
</table>

(1) Part of the goats are sold to hawkers from South Africa.

Table 7: Market access according to the production

The livestock production, and especially the wool sheep and mohair goats, is the only way to earn cash. For that reason, it is interesting to look at how the wool and mohair commodity chain works, what are the farmers’ sales opportunities and then to review the economic and environmental impact of the wool and mohair marketing systems.

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\(^1\) In a normal situation, a rise in price causes the quantity supplied to increase and the quantity demanded to decrease and vice versa: the balance between the two is the equilibrium price.
Considering that wool and mohair production is not accessible to everyone, what are the other opportunities for subsistence farmers to develop cash income-generating farming activities demanding only low investments? and how they could be implemented and sold?

2 Wool and mohair production, the traditional way to earn cash

Merino wool, grown by Merino sheep, is a protein fibre, fine crimped and soft, being used to make light-weight worsted cloth and high quality woollens. Mohair is grown by the Angora goat and composed of long, lustrous, coarse but not hairy fibres and used in hosiery, upholstery and rugs (Ryder and Stephenson, 1968).

2.1 Overview of the evolution of the wool and mohair marketing system

2.1.1 Between 1870 and 1930: A commodity chain dominated by traders:

During this period, private traders dominated the marketing system and most of the wool and mohair was sold through them to brokers in South Africa. They were wholesalers owning shops (trading stations) all over the country and traded goods between South Africa and Lesotho. While traders worked on their own capital and were remunerated by a profit, the brokers facilitated the transactions, organized auctions and were remunerated by a commission. Some hawkers, itinerant traders going mainly to remote areas, were also involved in the trade but on small quantities. Traders were located at trading stations in many areas of Lesotho and despite their number decreasing, they are still present today: in the whole of Lesotho there are 25 private shearing sheds, located or not in the trading station, for 8 traders.

Traders and hawkers sold the wool and mohair to several brokers in South Africa. The role of hawkers in the wool and mohair trade was over by 1953: the government desired to improve fibres grading and classing and since hawkers were ill-equipped for that, they were forbidden to export the produce.

2.1.2 From 1936: The government’s efforts to organize wool and mohair commodity chain

In 1936, the government started to build shearing sheds to grade wool and mohair: it was classed and then sold to several brokers in South Africa. In mountain areas, these sheds were portable, folding tents, whereas in the lowlands they were stationary. Wool and mohair co-operatives were established and were in competition with traders. However, the co-operatives did not work well and had to liquidate, and traders kept their dominant role in wool and mohair marketing.

After Independence (1966), the government wanted to regulate the wool and mohair marketing system and to revive co-operatives. Indeed, the general belief was that traders made an excessive profit and farmers got low prices. The co-operatives were revived in the form of the Wool and Mohair Grower Associations (WMGA) in order to organize the wool and mohair commodity chain and to improve the fibre quality. The first WMGA was created in 1967, and the Makhapung branch in Matsoaing area in 1971.

2.1.3 The inheritance of the British protectorate: the “one channel” marketing system

In 1971, the government decided to establish a “one channel” marketing system for both wool and mohair. This was in response to the decrease of both demand and prices because of the
introduction of synthetic fibres in the world market. Although the nation had recently acquired its independence it remained a raw material producer, with the added value mostly done abroad. As Ki-Zerbo (1992) noticed, in most of the recently independent colonies, despite the africanization of the staff, the system remained financially and technically dependent on the ancient partners. Ryder and Stephenson (1968) added that “it is of interest that most Merino wool is grown in the southern hemisphere, yet the main manufacturing countries are in the northern hemisphere”.

Lesotho sold all the wool and mohair through the South African Wool and Mohair Boards (SAWB and SAMB) to several brokers. The brokers sold the produce through auctions to overseas and South African buyers. It was then decided that the two boards would sell the Lesotho produce only to one broker: the Boermakelaars Koop BKP (BKB). BKB was chosen because it took lower commissions, was willing to pay for multiple farmers (sometimes 40 farmers are involved in one bale of wool or mohair and this makes the payment complicated) and provides statistics about the production. Furthermore, the private traders in Lesotho had to sell the wool and mohair to the BKB as well.

A floor price system was then established to protect farmers against price fluctuations. But this system was abandoned in 1993 and Basotho farmers were compelled to compete with overseas producers. However there is now a more cautious approach to fluctuations, to make buyers more aware of the minimum price they should pay, which should cover at least the marketing costs.

From that moment, the traders' role tended to decline and their number decreased. Mokitimi (1988) noticed that between 1972 and 1975, the number of trading stations fell from 135 to 44. Nowadays, 5 traders are in the district of Mokhotlong, of which one owns the shearing shed in Mokhotlong and at the Sani Pass.

In 1978, the creation of the Livestock Produce Marketing Services (LPMS) enforced the role of WMGAs and started to work as an agent for them. One office is in Mokhotlong whose staff is in charge of advising on marketing and quality improvement. It also acts as the link with the broker, the SAMB and the SAWB, training the shearing shed staff for grading and recording etc. The LPMS is in charge of distributing the payment from the broker to the farmers through the government sheds.

2.2 THE CURRENT MARKETING SYSTEM: TWO POSSIBILITIES, THE NATIONAL SHEARING SHED OR THE PRIVATE TRADERS
The wool and mohair commodity chain for Matsoaing growers today is still working with two components: the traders and the government system (diagram 7). It is not easy to know which proportion of fibres is sold through the WMGA or to the trader because the traders do not record who sold his produce to him and in which quantity. Hence the percentages are just indicative.

2.2.1 The Government Channel, a Guarantee of Quality

2.2.1.1 An organization via the Wool and Mohair Growers Association

The WMGAs are associations created by the government of Lesotho in order to have an unique voice, to implement easily the wool and mohair improvement policies and to organize the commodity chain. Each association is administrated by growers, in the form of non-profit making farmers' associations. They are under government regulation through the LPMS, who supports them technically (local livestock officers advise the farmers) and financially (staff payment, shearing shed maintenance etc.). Farmers run their own shearing shed, organise the marketing of wool and mohair, transport, and are involved in improving wool and mohair production. All the members have the same rights (one member = one vote) and a committee is elected every year. The organization operates at different levels, from local to national (diagram 8).

Not all the livestock owners can be members of the WMGAs. In addition to the basic requirements below there is also a membership and shearing fee, as well as minimum quality requirements:
- buying improved rams and billy goats (mostly from South Africa)
- not keeping coloured animals

For that reason, there are two sections of farmers in the WMGAs:
- “progressive farmers” (WGAs) who are members and are able to meet the requirements: their number tends to increase (they were 74 in 2006 for the WMGA of Makhapung and 92 in 2007)
- “marketing groups” (MGs) or “training groups”: they are owners who want to improve but are starting. They are under the guidance of the association and once they have improved, they can be “progressive farmers”. As they are improving, their number tends to decrease (in 2006 they were 111 for the WMGA of a and 107 in 2007)

WGAs and MGs shear at the government shearing shed but do not shear at the same time. MGs shear first and the produce is not mixed with the ones of WGAs. Thus, in the catalogue of the BKB for overseas buyers, the two kinds of produce are distinguished with the annotation “WGA” or

Diagram 8: Hierarchy of the Wool and Mohair Grower Associations
“MG”. In the same way, produce coming from the traders is mentioned as “TRA”. Moreover, the buyers know exactly from which district the wool and mohair comes from.

In the Matsoaing area, almost all the small livestock owners are members of the WMGA of Makhapung indirectly. Since all the larger livestock owners are directly members, all the small livestock owners participating in mafisa, or the parents relying on their son to take care of their flock, benefit from improved rams and billy goats, have access to the injections, and are able to have their flock sheared at the government shearing shed. Thus, the number of farmers involved in WMGA is much higher than the one shown on the statistics because whatever number of owners are involved in a flock of a larger owner, he counts for one member.

2.2.1.2 In the WMGA's shearing shed, an organization which reflects international demand

During the shearing season, each wool and mohair grower brings his whole herd/flock to the shearing shed at a certain date that was previously planned during the WMGA's meetings. The sheep and goats are manually sheared, with single-bow sheep shears (sketch 20), once a year each: sheep from October to December and goats from April to May.

The owner's animals are sheared in one visit and the raw produce (greasy wool and mohair) is immediately sorted by the shed's staff. This first classing is preliminary, as the BKB sorts the produce again once it has been received. The quantity, analysed by quality, per farmer is recorded immediately in a record book during the same day. This means that the payment is fair and the system permits precise feedback to the farmers to enable subsequent quality improvement. However, the farmers are paid only after the auctions have been done: the global payment is made from to BKB to the LPMS which then pays the farmers. No wool or mohair sheared at home is accepted at the shearing shed: it avoids contamination, bad shearing or sorting.

Each WMGA employs permanent staff (livestock owners) during the shearing season, paid by the government, and hires its own shearers (paid by farmers, 1 Maloti per sheep or goat sheared). Before each shearing season, refresher training classes for grading wool and mohair are run by the LPMS. Since the quality standards fluctuate from one year to another, these refresher courses are important, permit the growers to maintain their position on the international market, and increase the value of the produce in the shearing shed. The wool and mohair are classed at the shearing shed by the staff, packed in bales and stored until the end of the shearing season and then transported via the Sani Pass to the broker.

Transport costs are paid by the farmers (a tax is taken per kilogramme of produce), and they have to hire a truck from South Africa that comes once all the bales are ready.

2.2.1.3 A late payment

Via this channel, the farmers have to wait until the shearing season is finished to have their produce sent to BKB, then to wait for the auctions and the payment from overseas buyer to BKB, then to wait for BKB to pay the LPMS, the payment registration by the LPMS and to finally wait for the payment from the LPMS to the WMGA, who can ultimately pay the farmers!

The delay between the shearing and the eventual payment can be very long, up to 6 months, and there are only two payments a year: one for the wool and one for the mohair. Moreover, the farmers do not have any idea of what the payment is going to be, and are vulnerable to price fluctuations because of market conditions.
2.2.1.4 Subsequent quality improvement effort by government

Each year, after the payment, LPMS technical officers meet farmers at the National WMGA to inform them about which district had good quality or not. They then meet with local WMGAs and even with individuals to educate them about the link between prices and quality and about quality requirements. Moreover, every year a “study tour” is organized for 20 farmers for them to see and understand how their wool is sold, what is a good quality etc.

2.2.2 The private trader: an alternative channel to get quick cash

2.2.2.1 The priority on the profit margin rather than the quality

The private trader is a wholesaler trading animal fibres as well as tillage tools, clothes or dishes. He works with its own capital and is remunerated by a profit. To trade wool and mohair, the private trader has first to ask for permission from the government, must have his own shearing shed, and be able to justify liquid cash availability (more than M30,000) to be able to pay for clips from the growers.

The Mokrafs Company owns two shearing sheds in the Mokhotlong district (one in Sani Top, one in Mokhotlong) but also accepts the wool and mohair that have been sheared at home. The farmers in Matsoaing who sell their fibres to the trader manually shear at home rather than at the trader's shearing shed because of their distance from the shed.

The trader buys any quality (even the coloured fibres) at any time of the year, giving the payment as the product is delivered. He then stores the produce to sell it only after the official shearing season. Nevertheless, he pays a lower price to farmers than through the government sheds. Like the WMGAs, he sorts the wool and mohair by quality before sending it to South Africa. The quantity recorded for each quality per farmer is supposed to be recorded in a record book.

There are no set rules in determining trader's profit mark-up. However, the traders' marketing margin is determined by the Produce Sub-Committee (PSC) and the government has to approve it. It is not clear how PSC arrives at traders' marketing margin, but it avoids them making an “unreasonable profit” (Mokitimi, 1988).

Nevertheless, traders are increasing their margin because they are artificially inflating their marketing costs (determined by traders and only applicable to them). But the government has an interest in having traders, and not only government sheds, to avoid smuggling: farmers have the choice and in case of the need for quick cash, they can sell their wool and mohair to the trader.

2.2.2.2 A channel used by all the wool and mohair growers to answer a need for cash

Almost all the farmers sell some wool and mohair to the trader for three reasons.

- Through the WMGAs, the payment comes only twice a year. When they need money between those two moments, the farmers sell a part of their wool or mohair to the trader. However, they sell only the worst quality they have because the trader gives much lower prices.
- At the government shearing shed, the lowest qualities are not recorded (it can be a part of the clip, a coloured animal or a cross-bred animals) and are given back to the farmers: those products are then sold to the trader.
- When an animal is slaughtered, it is sheared at home: the fleece can only be sold to the trader.
Finally, the trader answers the farmers' need for cash, at any time, which cannot be done through
the government's channel.

In 2006, 3,100 goats were sheared at the Mokrafs Company's shed at Sani Top (involving 321
farmers of different valleys).

2.3 Raw Material Produce Sold Entirely Abroad

The product leaves Lesotho as greasy/unwashed wool and mohair. The fibres are traded on the
basis of their scoured weight, as 30 % to 50 % (in the case of wool) of its raw weight may be
accounted for by suint, wool grease (lanolin) and dirt (dust, excrements, vegetal contaminants).

Before leaving the country, the products of each shearing shed are certified by a vet as free of
parasites. From the Mokhotlong district, the fibres go by truck through Sani Pass to the broker's
warehouses (BKB) in South Africa: the wool is taken to Durban while the mohair is all taken to
Port Elizabeth. However, since the auctions are centralized in Port Elizabeth, a sample of 10 kg of
wool per 10 bales is taken there for the auctions.

Once the produce is in the warehouse, the BKB sorts it again and has the South African Wool
and Mohair Testing Bureau make objective measurements. Auctions are then organized with South
African and overseas buyers, and the payment to the LPMS or the private traders is only made
afterwards.

After the sales, the fibres are pressed to high or medium density so as to reduce the sea freight
costs. Then the wool is sent by ship directly from Durban and the mohair from Port Elizabeth.

Most of the wool and mohair processing is done in the Northern hemisphere. But as some buyers
want semi-processed (skirted and washed), or processed (see text box 8) wool or mohair, some of
the produce is processed in South Africa before being sent overseas. No industry for processing
wool and mohair exists in Lesotho and almost 100 % of the production is sold abroad: indeed, the
mills have to be operational 24 hours per day for the whole year in order to be profitable
(Ramokuena, 1994), and the quantities produced in Lesotho are not big enough (studies have been
conducted by the Ministry of Marketing to assess the possibility of developing processing industries
in Lesotho but the conclusion was that the quantities are too small and that it would not be
profitable). The proportion staying in the country for handicraft purposes is insignificant.

From the raw wool to the processed wool:

Greasy wool has a fibre content of only 50 % (the rest being grease, suint, water and dirt). The
fleece must be clean before it can be processed into wool yarn.

Skirting: The wool from the back end of the sheep, their legs and sometimes their belly is too full
of manure to use. These are removed first before washing the fleece; this process is
called skirting, as all the edges of the wool coat are removed.

Washing/scouring: The grease and suint are removed from the wool. This can be done using soap
or detergent or by submerging the wool in an acid bath which dissolves all the
vegetable matter as well as the grease (scouring).

Picking: The washed and dried wool is then "picked" which is the beginning of the process of
opening up the locks of wool and turning it into a consistent web. The wool is put
through a picker which opens the locks and blows the fluffy wool into a room. .../...
Carding: The wool fibres are then put through a series of combing steps. This can be done with machine driven drums covered with "card cloth" which combs the wool many times by transferring it back and forth from one drum to the other as it is passed down the series of drums.

Roving: The final step in the carding process divides the web into small strips called pencil rovings. These are collected on large spools on the end of the card. These spools of pencil roving will be placed on the spinning frame to make yarn.

Spinning: The roving as it comes off the card has no twist. It is held together by the oil and natural hooks that exist on the surface of the wool fibres. The spinning frame will put the actual twist on the roving and turn it into yarn.

The yarn can then be used for knitting.

Text box 8: The different steps of wool processing

2.4 Traders and WMGAs, two opportunities for sales, two levels of payment:

As the private trader and the WMGA shearing sheds are the two opportunities to sell wool and mohair, it is interesting to have a look at the differences between the payments, but before this it is necessary to understand the quality criteria.

2.4.1 Good price? Good quality rather than quantity

2.4.1.1 The example of wool quality criteria

The main factor in determining the value of a fleece is its pure wool content. The clean yield is of particular importance to the wool buyers as it is a close estimate to the usable quantity of wool present in the clip. Lesotho wool yield is generally low (about 50 %, Ramokuena, 1994): it implies that more money will need to be spent on its processing.

The main criteria for quality are 1) fineness, 2) strength, 3) contamination and 4) length. The quality varies to the area of the body from which it comes, as shown in the sketch 21 below (clean wool yield refers as the level contamination).

Sketch 21: Variations of wool quality parameters of different body areas (From Ensminger & Parker, 1986)
1 **Fineness**: The highest quality of wool is of 14 microns but in Lesotho the average is 18 microns. Most of the buyers overseas want wool of 14 to 16 microns. Lesotho has only 13.5% of its wool between 18 and 19 microns and thus cannot supply high demand. The government, through the WMGAs, is working on fineness improvement with genetics and advises growers to sell their animals that are beneath that quality and to buy improved rams.

2 **Strength**: a minimum resistance of 35 kg-force/cm² is expected; below that the wool breaks during the spinning or knitting.

3 **Contamination**: it is mainly from vegetable matter and mud. *Xanthium spinosum L.*, mainly found in the mountain grazinglands, is particularly a threat and has been classed by the government as a “dangerous species” they have to eradicate. Indeed, this grass grows along the road, and the water springs, and becomes tangled in the fleece, thus lowering wool and mohair quality, and causing discomfort to the animals (Holm *et al.*, 1977). Moreover, the night paddocking contributes to stain the wool with mud and excrements.

4 **Length**: the minimum required is about 65mm. On this criteria, Lesotho is doing well with only one shearing per year. The wool growth is almost of 10 millimetres per month. However, if farmers decide to shear twice to sell to the trader and through the WMGA, this requirement cannot be fulfilled.

### 2.4.1.2 Wool and mohair quality in Matsoaing

In 2006-2007, 11,644 sheep were sheared producing 33,951 kg of wool, and in 2007, 6,000 goats were sheared at the WMGA shearing shed of Makhapung, producing 6,710 kg of mohair. Thus, the wool and mohair growers of Makhapung produced 2.9 kg of wool per sheep and 1.1 kg of mohair per goat.

The district of Mokhotlong is the one where the wool and mohair quality is the best in Lesotho. The record books of the LPMS enable a categorization of the different qualities of wool and mohair clips in Makhapung (the different classes in *appendix 15*). About a third of the wool and mohair produced in Matsoaing is stained because of mud or contaminated with vegetable matter. Furthermore some livestock farming practices are responsible for the decrease of the fleece quality, as penning at night or an insufficient supplementary food.

### 2.4.2 Average income per sheep and goat via the government channel

Apart from market demand, the price per kilogram of greasy wool or mohair depends on two main factors: the quality and the quantity available for a certain quality (Ramokuena, 1994).

But from the initial payment received, many deductions are made by the government and the broker before the final payment to the livestock owner is set. Even if some farmers are aware of what the deductions are, the majority of them are not: the first information they receive on the value of their produce is when they receive the final payment.

Thus on average a wool clip brings in M116 and a mohair clip M60 from which about 22% is deducted. That is to say that at the end farmers get M90 per sheep and M47 per goat (the detail of calculation is in *appendix 16*). About 20% of the deductions are for the broker, while the major part (70%) is for the government, to pay for operating expenses, staff wages, vaccination campaigns and so on. Only the deduction for transport is taken directly by the WMGA.

The other fees involved in the functioning of the WMGAs, such as the registration for shearing (M0.5 per animal), or M1 per animal sheared, are paid separately, directly at the shearing shed, and do not appear as deductions.

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1 As a mean of comparison, South Africa produces 3.96 kg/sheep and 3.86 kg/goat (Hunter, 1987)
2.4.3 **Average Income per Sheep and Goat via the Trader**

The calculation *(appendix 16)* for the payment given by the trader is done according to the standard quality given by the LPMS for the Makhapung WMGA *(appendix 15)*, but the payments from the trader are frequently much lower. As a result, the farmers sell only the lowest qualities to him, thus getting an even lower price. Accordingly, a total of M29 per sheep and M17 per goat is earned by farmers.

Although the prices given by the trader, for comparable quality, are three to four times lower than through the government channel, the farmers keep on selling a little part of their produce through this channel because they need cash between the two payments from the LPMS.

2.5 **Added Value Made Abroad: The Example of the Basotho Blanket**

The Basotho blanket is popular in the country and nearly all the individuals possess one, the youth as well as the elders. But compared to the price of the raw material exported, the price of these blankets is high (M500 for the highest quality, which is the favourite of the customers). Indeed, since no textile industry is established in Lesotho, the animal fibres are sold abroad to be manufactured, and then the finished articles are imported to Lesotho by wholesalers. Thus all the added value is made externally, and most of the blankets come from only one textile manufacturer. Most of the Basotho blankets are imported from South Africa, so the transportation costs involved are not very high, compared to overseas production. *Sketch 22* illustrates the price received by each of the stakeholders involved in the wool and mohair trade and transformation (via the government channel). It has been assumed that 2 kg of clean wool is necessary to make a blanket. However, the clean yield of the raw wool in Lesotho is of about 50% so 4 kg is required for each blanket.
Of the overall price of a blanket, most of the added value is made abroad. The price of the blanket is more than four or five times higher than the sales price of raw wool. And farmers are one of the buyers of those blankets.

2.6 Farmers directly competing on the international market

The economics of wool and mohair production reflects only the “capitalism level” of Braudelian stages. Because of the commodity chain organization, the farmers are involved in free trade and undergo the consequences of a such system: price fluctuation and total detachment from the market place.

“(farmers) have to compete with everybody. If the government supports them, in the future Lesotho will lose the market. Being a small country, we have to dance on the music of the World Trade Organization. We cannot do as France or the United States. The floor price system was really good for farmers, but for how long?”

(Ramokuena, personal communication)

2.7 Pastures’ conservation and wool and mohair production improvement: conflicting issues

The wool and mohair production in the highlands of Lesotho is highly dependant on the pastures, and hence, on their quality. Indeed, nutrition is of great importance for the health of the animals and wool and mohair yield and quality. But range land in Lesotho is often referred to as “communal resource”, and thus likely to be over exploited. The “tragedy of the commons” described by Hardin (1968) is that none of the individuals sharing a communal resource take into account of the social cost inflicted by their animals. So each individual stocks too many animals. The sum of this is overstocking by the group.

2.7.1 Calling for farmers conscience or implementing a grazing fee: vain attempts

Many solutions have been proposed by the government to decrease the livestock number and improve the quality of pastures, as by the World Bank for the Structure Adjustment Plan, but none of them have been effective until now.

The most discussed issue was probably the implementation of grazing fees. Mokitimi (1988), demonstrated that by having a grazing fee per animal, the production costs would increase and so the farmers would be expected to destock their animals so has to diminish the costs. But what would really happen if a such fee was implemented? The farmers would increase their flock so as to compensate for an increased production cost, and the small livestock owners, unable to pay that fee, would probably have even more problems to manage their flock by themselves.

Another issue, proposed by Hunter (1987) was to improve wool and mohair quality by encouraging owners to have smaller flocks while earning the same amount of money. However this would have the opposite effect: owners would increase their flock to earn more and improve their livelihood and still have a security against price fluctuation. Indeed, when asking about the perspective of evolution of their production, the livestock owners of Matsoaing think about letting the flock/ herd increase so as to earn more money.

For these two issues, one can assume that they would not have the effect expected because the studies have not been replaced in the context of small-scale farming. Indeed, since pastures are closely linked with livestock management in rural mountain areas of Lesotho, no solution can be proposed for pasture management before having been placed in the complex rural context.
2.7.2 Conservation measures in traditional land tenure

Pasture rotation is being implemented with the system of *maboella* but is not effective enough to let the grazing area recover. Indeed, the pastures are let for only one season without grazing but when they are open again, the high stock number leads quickly to the initial situation.

Moreover, since the quality of all the winter and village pastures is decreasing, the herd-boys are less and less willing to follow the law and take the animals to graze on these preserved *maboella*, where the grass is better, in order to keep the animals healthy.

2.7.3 The early stages of the herd-boy education, toward an improvement of farmers' awareness?

The herd-boys are key actors of the wool and mohair production; they are with the animals daily, taking care and feeding them. For that reason, they have a huge knowledge about livestock production and about the pastures. Moreover, most of the herd-boys are going to be wool and mohair growers later on, thus being the next generation of livestock owners.

Whereas all the children of Matsoaing go to school, there is no access to education programme for those who are herd-boys.

Only one local woman in Makhapung teaches daily the herd-boys in her own house after they are back from the pastures. The project, which started with teaching reading and writing to elders and in 2000, with the initial support of the NGO LANFE (Lesotho Association of Non-Formal Education), was reoriented for herd-boys. She teaches how to read, write and make handicrafts to herd-boys between 10 and 17 years old, between 6 p.m and 7 p.m after they have come back to the village. However, she is not supported in the project (she buys all the school stationeries by herself), and the Community Council has not yet invested in the herd-boy education. This project is only concerning herd-boys of Makhapung, who are really excited about learning how to read and write.

Furthermore, this access to education enables bridges the gap between the educated children and the herd-boys. Indeed the herd-boys are on the fringe of the community in which they appear as rough guys.

2.8 Traditional livestock production not accessible to the majority of the farmers

Access to livestock ownership is not possible for everybody. As it was already illustrated, only 50 % of the farmers of Matsoaing own animals, of which less than 30 % actually benefit from the cash income of wool and mohair. Indeed, the capitalization process is difficult when the crop system is not producing any marketable surplus; the cropping surface cannot be increased in the Matsoaing area and the soil erosion engenders severe losses in grain production.

Another opportunity can be found in high added value production requiring little space.

3 New accessible cash income-generating production: reaching the monetary economy

High added value production, requiring little space, is becoming of greater importance in the farms so as to generate a cash income with only a little arable land. Such a programme has been enhanced thanks to the presence of an agricultural advisor since 2004 in the Matsoaing area. Indeed, her aim is to develop cash income-generating farming activities in order to generate cash but also to improve the diet of the families. Moreover, unlike wool and mohair production, these activities are...
more flexible and farmers can easily adapt to market trends. Furthermore, this production is a way for farmers to reach the level of “ordinary economy” as defined by Fernand Braudel.

However, some farmers are sceptical about this production because they are worried about how to sell the produce. Hence not only the production, but also the distribution has to be considered. Nevertheless, the Matsoaing area has the advantage of being only 30 kms from the town of Mokhotlong, which is accessible by collective taxis.

3.1 Poultry: the early stages of an accessible livestock production

Poultry production has been known for a long time in the Matsoaing area. Indeed, with the pasture deterioration and the lack of space, some farmers, especially women, are aware that this production has the potential to provide them with food and cash.

However, it is not implemented by many farmers due to a lack of means to buy the first chicken, to produce or buy the grain, or because the farmers do not appreciate the benefit of such production. Indeed, farmers lacking sufficient land to produce enough food for the family may be reluctant to use a part of their harvest for animal feeding.

“I would like to have poultry but I don’t have the means to buy the chickens” farmer in Mathakheng

“I thought about having chicken, but until now I did not have field to produce grains. How could I feed them if I cannot feed my children? But now I have got a field and I hope I will be able to raise poultry” farmer in Tserela

For the moment, the farmers raising poultry mainly sell a little part of their produce in the valley, and seldom to Mokhotlong.

3.2 Vegetable gardens: little production costs and little space requirement

The vegetable gardens are of small size (less than 50m²) and always very close to the homestead for fear of being robbed, and because they require intense labour for weeding and watering. Thus the land is easily fertilized with ashes from the hearth or poultry droppings.

The main horticultural crops are: mustard, rape, onions, carrots, tomatoes, beetroots, spinach and cabbages. The potatoes and the pumpkins, although originally grown in the fields, are now grouped with the vegetable garden production: farmers are becoming reluctant to grow them far from the house because of theft.

Improving the cropping of all those species enables all-year production (cropping calendar in appendix 17), thus allowing an improvement of the diet, mainly of children and HIV positives, and the sale of produce to earn cash at any time.

Peach trees are also planted in the garden and provide fruit, consumed fresh or preserved (notably jam), from February to end of March. Anyone can get a tree for free from the Ministry of Forestry in Mokhotlong.

The farmers sell a part of their produce in the valley or occasionally in Mokhotlong. However, the pumpkins, easily storable, and mustard and rape, consumed as leafy vegetables, are seldom sold but kept for the household consumption.

With a small garden of 25 m² and two peach trees, a minimum income of M670 could be expected per year (calculation in appendix 17) The example is made on a very low production so as not to over-consider the chance of each farmer to get the seeds and have a sufficient area to grow the vegetables. The data have been obtained through interviews with women already growing vegetables.
3.3 The challenge: access to local markets to find outlets

Since the population is almost only constituted of subsistence farmers, the market for farm produce in the valley is low.

“I plant vegetables but I never thought about selling them here. There is no market in the valley, almost everybody produces vegetables” farmer in Mathakheng

The only way to sell vegetables or poultry is in Mokhotlong. But with the ongoing process of Economic Partnership Agreements with European Union, and the competition with the South African products invading supermarkets, it is more and more difficult for farmers to supply local markets with their produce. The Chinese-owned shops in Mokhotlong sell vegetables and jam coming from South Africa. Besides, the butcheries buy meat from local farmers, who have to come and ask to sell their produce. But they have to buy animals in the lowlands or in South Africa as well to fulfil the demand.

Moreover, the main challenge is always the costly transport from the farm to the nearest town. “The smallholders maintain that the high cost of transportation highly exceed any profit they might contemplate on their produce or indeed the recovery of production expenses they might have incurred” (PELUM-Lesotho (b), p1. 2008). Indeed individual farmers are too small to be able to engage in marketing and selling their produce in a sustainable and profitable manner. Moreover, the price of the taxi (M28 the round trip), does not allow individual farmers to make profit by selling only a little quantity of produce.

The people living in town are already buying farm produce during events like the agricultural show or the farmer national day: jam and preserved fruit or vegetable mixture are particularly appreciated.
WHAT ARE THE ISSUES FOR MATSOAING'S FARMERS?

1 What future for the wool and mohair production in the Matsoaing area?

1.1 Conflicting issues: Wool and Mohair Production Improvement and Pasture Conservation

The poor condition of the grazing areas, particularly B and C, is a threat to wool and mohair production, and vice-versa. Indeed, wool and mohair production and pasture management are conflicting issues:

- while the government of Lesotho is focused on improving animal fibres production, pasture conservation becomes a critical issue,
- if the pastures keep on deteriorating, to compensate for the lower quality of the grazing areas, livestock owners are going to have to spend more and more to supplementally feed the animals, and to medicate them,
- if there is no supplemental feeding, the deteriorating pasture quality causes lower wool and mohair quality and yield,
- the farmers’ response to deteriorating quality, higher costs and lower yield is to attempt to maintain income by increasing the size of their flocks/herds. And the pasture are deteriorating even more,
- pasture conservation, by limiting the number of animals, is not possible as the farmers see livestock as a form of savings. They are not willing to keep few animals as they prefer the security of increasing flocks/herds.

One can assume that the number of small ruminants is still going to increase because it is the only way to earn cash and to exceed the survival threshold.

1.2 Educating the Herd-boys to Enhance Sustainability of Wool and Mohair Production

The durability of a system based on keeping sheep and goats on communal pastures relies on the maintenance of good pasture conditions. The way to improve pasture management might be started by raising the awareness of the farmers and notably the herd-boys about natural resource conservation.

The initial project of educating herd-boys in Makhapung could be enlarged to cover the whole Matsoaing area. According to the specific needs of the herd-boys, a particular teaching programme could be implemented, both for the schedule as well as for the components of the programme. A program linked with animal production, range land management, conservation of the species, in parallel with reading and writing, could benefit them. A higher level of education could also more closely involve the herd-boys and farmers themselves in resolving natural resource issues.

Moreover, some traditional practices for pasture conservation, like the maboella, could be enforced to be more efficient.
1.3 The wool and mohair commodity chain

The current functioning of the wool and mohair commodity chain, with two channels, permits the growers to have two opportunities for sales. While the government channel gives higher prices, the payment occur only twice a year, and this does not answer the farmers need for cash: here, the trader plays an important role. As a result, the combination of the two channels is a system, whose two branches are complementary.

Wool and mohair growers are selling their produce on the international market, they have no protection and therefore compete with other farmers who are more productive than them. Hence, an emphasis could be put on doing meat production as well, which would increase yield per animal and compensate for increasing production costs.

The basic item of clothing in the rural mountains is the woollen blanket; this product is imported from abroad, with almost no added value made in Lesotho. Whilst it is tempting to consider the possibility of local production and creation of value added in Lesotho, the existence of customs unions like SACU, the possible evolution of IEPA and the fact that Lesotho is surrounded by the RSA mean that this may not be a commercial proposition.

2 The essential development of new cropping practices and cash income-generating activities

2.1 The striking problem of soil erosion

Crop rotation is little practised, which exacerbates the problem of soil erosion. But the absence of rotation is not only linked with the land availability but also with the field location. Even the farmers who have three fields might not rotate because they fear thefts. Farmers are aware that soil erosion is important but have little knowledge about crop rotation and how to maintain the fertility of their soil. During the de-briefing, farmers where particularly interested in this topic: “Since I need to plant maize every year on my only field to feed my family, how can I rotate or leave the field fallow?”. An emphasis could be made about the effect of letting part of the field fallow every year, and/or find ways to fertilize the soil organically using the local means. Literature from Lesotho already exists about these topics.

Even though wheat yields more than maize, one has observed that maize is a staple food crop. It has been for decades and this apparent contradiction indicates that it may be more important to consider changing working practices rather than the cropping.

Another issue is the low ownership of draught animals and drawn tools (especially the plough). This causes a high dependence of one large section (two thirds of the farmers have no mechanization) of the farming community on the other small section of wealthy farmers (those represented in the farming system (4)). This causes lower yields most particularly in the maize storey (timing of fieldwork, no means to prevent soil erosion by ridging etc.).

2.2 Shortage of arable land: activities requiring little space, a solution?

The arable land shortage combined with a low capital intensive farming is a problem for most of the families, as it causes food insecurity. Nowadays, only a few fields are available, livestock production is less and less accessible, and farmers need to find alternative ways to produce food which are more economical of space utilization, and to earn cash. While the men are still focused on

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livestock production, women try to find new activities which might be rapidly profitable. Considering the long time required to develop livestock production and to have a cash income from wool and mohair, one wonders if focusing on new farming activities might not be a better way to earn an income.

Although already familiar with the cultivation of vegetables, which have been implemented by an increasing number of women, vegetable gardening is still not a core activity. The price of the seeds is affordable (about M30 per year for the whole garden) and the ashes from the hearth can be used to fertilize the soil. Moreover, getting a little piece of land for a garden is easy.

Poultry production, as for vegetable gardening, demands little space, and creates high added value. However, it requires an initial investment to buy for example the first rooster and hens (M9 each at 4-weeks old) and to advance the food expenses before having a cash income from the first sales (eggs or animals). The profit made with poultry production can be used to buy food for the family, and can even enable a more diversified diet with meat and eggs. Moreover, the Likokoekoe hens are hardy and eat many things in the garden or around the household, thus reducing the feeding expenses.

A short technical and economic analysis has permitted an assessment of the wealth generated by poultry production on a 16 months-period (see appendix 18), starting from an initial group of 4 hens and a rooster. The result is that the benefit could be of about M1500 per annum, about the same as that already produced by farming systems (1), (2) and (3). This could help the farmers to progressively reach the survival threshold.

Compared to wool and mohair production, vegetable cultivation and poultry production could enable a quick return of the money invested, and a good cash income could be achieved after a year and a half.

Creating more added value in the farm can also be achieved by making jam or preserves with for example peaches or vegetable. This produce could be sold through small supermarkets in Mokhotlong. A deposit on the pot, which would be refunded as the pot is given back, would allow the farmers to recycle the pots, and thus to lower the packaging costs.

Farmers awareness and understanding of market conditions needs to be raised if they are to conduct a commercial relationship with the shops.

3 The importance of working in a group

3.1 Reaching local markets and enhancing accessibility to livestock production

Working in groups would enhance the possibility for farmers to access the markets (for vegetable and poultry) more efficiently. The shops in Mokhotlong would find it much more attractive to accept high volumes and to have fewer interlocutors. In addition, transport costs for an individual farmer would be reduced if there was a coordinated marketing approach.

Since poultry and vegetable production is a new activity, and therefore perceived to be risky, farmers need successful examples to follow. Another problem is that given the social character of the area, there is not a high appreciation, or execution, of interdependent, and trusting, behaviour. For example most of the groups created by the agricultural advisor failed because the interest in working together was not evident. Most of them highlighted the difficulty to group with other persons they did not know because of an overall concern about dishonesty.

“If I group with other persons of my village and we have to pay a membership fee, what will happen if one of them does not follow the rules and tries to rip me off?” a farmer of Makhapung
Grouping is not only an issue for poultry and vegetable production but also for rearing animals. Many farmers are in the situation of having a herd/flock too small to afford to manage, but there is no grouping to share the costs involved in livestock production. But grouping with two or three small livestock owners would reduce the length of the period of mafisa, thus enabling a benefit from the wool and mohair clip earlier. But as it has been explained previously, farmers are not yet willing to do this:

“If I do that, one of the other farmers will just live the group without paying what he owes to the herd-boy we hire for example. You cannot trust people here!” a small livestock owner of Ha Maile.

Indeed, the most vulnerable families (farming systems (1), (2) and (3)) cannot afford to start new activities or enter into a group organization that might fail and cause a loss of the initial investment. For this reason, most of the farmers work individually, which undermines their chance to access the local market and to make a higher income from livestock production.

To encourage the formation of groups, the role of the agricultural advisor could be enforced.

3.2 Microfinance to diversify the farming activities

Developing new farming activities implies some initial investment. In the Matsoaing area, access to cash is low, and the only way to save is through livestock production. As a result, farmers keep many animals as savings, and sell them or go to the trader when they need cash. Moreover, the families who own no animals at all have no means of making an investment because they have no access to cash or savings.

A system of micro-finance could allow farmers to diversify their activities (even non-agricultural). Systems of community savings and loans associations already exist in different parts of Africa, established in rural areas by the villages themselves with an initial technical assistance (training about accountings etc.), and have proven to be successful (USAID Guinea). Nevertheless, a system like this could be done only for activities permitting a quick return on the initial investment, like poultry or vegetable production.

4 Use local dynamics

4.1 Relatively secure farmers: an opportunity for the development of the valley?

A first step to go towards an improvement in the livelihood of Matsoaing's farmers might be to use the ongoing dynamics and local initiatives of the valley, to support and to strengthen them.

The mixed crop and livestock farmers (farming system (4)) are important actors in the development of the Matsoaing area. Indeed, as explained in the sections farms' differentiation and technical and economic performances, they have money to invest in farming activities and create seasonal employment. On the one hand, the seasonal employment restrains many farmers from leaving the valley to look for jobs. Indeed, if nobody had money to hire other persons, many farmers from the farming system (2) and (3) would have already left the valley. On the other hand, their chance to invest in new farming activities could make them a focused point to create an example, to other farmers, of new farming practices/activities. Indeed, this section of farmers is more likely to take some risks.

Furthermore, the large-scale farmer, who is originally from the Matsoaing area, could also help to improve the livestock keeping practices. Indeed, he already advises the farmers about livestock management, medicine etc.
4.2 Participative approaches for people's empowerment

Participative approaches are getting more and more important in development projects implementation and for people empowerment. Capacity building of local communities is one of the conditions for a project to be adopted in the long-term by people. In that way, they are not spectators but actors in the process.

Participative approaches often consist of implementing group exercises so as to have farmers discuss their daily life and constraints, and to create independent, individual thinking about how to overcome the challenges. Many of these challenges are not ones that an external observer would easily discern, and thus, participative exercises are essential to understanding the local priorities.

However, criticism can often be made of those participative processes in the sense that they may appear to be simply producing data, and that people do not feel especially involved in the implementation of the project. Moreover, basing a study only on participative exercise does not always result in getting all the information required. For that reason, combining the methodology of the agrarian diagnosis taught at the Institut des Régions Chaudes, Montpellier (France), in a first phase, and participative exercises in a second phase, could be relevant to enhancing the capacity building and sustainability of a project. The agrarian diagnosis to deeply analyse all the ins and out of the agrarian dynamics, and the participative exercises to involve farmers and understand what are their main issues.

Despite the wish of the GRET to implement such participative exercises in parallel with the field research, the period of the study and the low awareness of people concerning the aim of that work did not permit this. Indeed, the study took place during the harvesting period, which is, as it is shown on the calendar of activities, the busiest time during the year. In addition, due to the remoteness of the area, traditional authority is the only kind of organization which people are used to, and only few projects were implemented there, often in the form of donations (no action coming from the communities). Thus the population did not know what is an NGO and how it could help to develop their farming activities without doing donations.

Moreover, the farmers had not been informed either about the researchers' coming or about the aim of the study, and hence, despite the efforts to explain in detail why the two researchers were there, they were sceptical on the effectiveness and purpose of their presence during the first 6 weeks. Hence, the “participative approach” has remained at the level of informing, and enhancing the population's awareness about PELUM's work, and the importance for them of themselves realizing their challenges, how to overcome them, and how working collectively could enforce their individual actions. Some farmers have shown a high interest and are already giving encouragement to other farmers to develop new activities, and find ways to reach local markets.
Conclusion

The study that was conducted in the Sehonghong valley reveals that wool and mohair production can benefit a small group of farmers, but it is unlikely that it could act as a pivot for the development of the mountain people. Indeed, because of the rise in the cost of production, only one third of the families own animals and can afford to raise Merino sheep and Angora goats.

At the national level, this production could bring in more to the farmers, and the country, if the value added, all currently captured abroad, could be generated in Lesotho. Certain aspects of the government's involvement in the production and marketing channel are not well suited to the farmers' needs (farmers do not know when they will receive the payment), and there is a weakness in the system in that farmers are sometimes forced to sell at low prices to traders when they need cash.

In addition, animal fibre production has been undermined by the deterioration of the pastures. Indeed, the sustainability of any production is questionable given the poor management of the communal pastures.

Besides, as has been highlighted, the majority of the farmers, almost two thirds of the population of the Matsoaing area, do not possess animals (neither sheep, goats nor cattle). On the one hand, because they have no wool sheep nor mohair goats, they earn no income. Also since they have little access to draught animals and drawn tools, crop yields are negatively affected. The combination of all these factors means that these group of farmers is compelled to engage in « off-farm » activities to meet their needs.

On top of this, the shortage of arable land raises new challenges for these farmers. The problem of erosion cannot anymore be solved by looking for new fields. The present generation has access only to small fields.

Thus, in the absence of cash income from wool and mohair, new farming activities that require little space and that are profitable could provide an opportunity to improve the livelihood of Matsoaing's small-scale farmers, and in addition would permit to create added value within Lesotho. In particular, the local agricultural advisor is focusing on developing poultry and vegetable production. However, the farmers, who traditionally always focused on sheep and goats, are only just beginning to appreciate the importance of such production.

Furthermore, these new farming activities of vegetable and poultry production are mainly conducted by women. Given the numerous widows in the valley this type of production could be of particular importance.

Another reason to justify a focus on vegetable and poultry production would be to help enhance the diet. This could be particularly important for this population which is severely affected by HIV/AIDS.

Nonetheless, despite the fact that these new activities require a low investment, most of the families cannot afford them. The development of a system of community savings and loan associations could be a good investment to help the trend towards this new area of production. One other problem is the relatively high cost of marketing the produce. Transport costs are high, even to local outlets and the output of individual farmers would need to be combined to reduce these, and to make the output more commercially attractive to buyers. Such an evolution would imply a more market oriented production and the farmers need to be advised and educated. PELUM can support them in that way.
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### Appendix 1. Calendar of activities

<table>
<thead>
<tr>
<th>Period</th>
<th>Topic</th>
<th>Objective</th>
<th>Methodological tools</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>February and March 2008</td>
<td>Preparation of the training period in France</td>
<td>Global comprehension of the training's objective and of the main issues</td>
<td>Bibliography prior to departure, logistic matter with the GRET supervisor and PELUM coordinator</td>
<td>Calendar of activities, main objectives' definition, planning for future de-briefings.</td>
</tr>
<tr>
<td>4th - 6th of April</td>
<td>Meeting with the supervisor of GRET and the coordinator of PELUM in Maseru</td>
<td>Presentation, definition of the main objectives and PELUM's expectations</td>
<td>Presentation of the methodology that is going to be followed</td>
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</tr>
<tr>
<td>6th - 10th of April</td>
<td>Installation and meeting with the interpreter and the different local authorities</td>
<td>Present the objective of the training and the future PELUM's work in the valley</td>
<td>Presentation of the methodology and the future interviews and gatherings</td>
<td></td>
</tr>
<tr>
<td>7th – 20th of April</td>
<td>Landscape analysis and determination of the different agro-ecological zones</td>
<td>Understand how the landscape is organized, having a global understanding of the main farming activities</td>
<td>Walking round the study area, in every different agro-ecological zones. Soil analysis</td>
<td>Highlight of the agro-ecological zones and farming activities and social organization. Hypothesis about the history of the valley. Drawing of a diagram.</td>
</tr>
<tr>
<td>20th of April – 20th of May</td>
<td>History of the agrarian dynamics in the study area and about the grassland use</td>
<td></td>
<td>Semi-structured interviews with the elders</td>
<td>Understanding of the history of the valley and the main dynamics. Elaboration of a pre-typology and of a grassland's use scheme</td>
</tr>
<tr>
<td>23rd of April to 2nd of May</td>
<td>Week in Maseru to present the first results to the GRET</td>
<td>Discuss about further point to analyse and the</td>
<td>Summary of the main results and hypothesis</td>
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<tr>
<td>Date Range</td>
<td>Activities</td>
<td>Linking Activities</td>
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<tr>
<td>23rd of April to 2nd of May</td>
<td>Bibliography at the National University of Lesotho Data about the climate at the Lesotho Meteorological Services</td>
<td>Link the datas collected with the interviews and general datas about Lesotho's history, dynamics and climate.</td>
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<tr>
<td>30th of April and 29th of May</td>
<td>Interviews about the wool and mohair commodity chain at the LPMS in Maseru and Mokhotlong</td>
<td>Understand to wool and mohair marketing system in Lesotho, and more particularly in the Mokhotlong district</td>
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<tr>
<td>20th of May - 15th of June</td>
<td>Crop and livestock system analysis</td>
<td>Understand the different systems existing and how they are related. Linking crops and livestock system, understand the relations between the different farming strategies</td>
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<tr>
<td>5-6 of June</td>
<td>Determination of the survival threshold.</td>
<td>Know the minimum income require per family</td>
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<tr>
<td>15th -22nd of June</td>
<td>Economical analysis of the different farming systems</td>
<td>Compare the farming systems and highlight their viability, on the basis of the survival threshold.</td>
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<td></td>
<td></td>
<td>Assessment of the sustainability of the farming systems and the opportunity to find income-generating</td>
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<tr>
<td>Date Range</td>
<td>Activities</td>
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<tr>
<td>22nd - 24th June</td>
<td>Field visit of the Pelum coordinator in Matsoaing area. Discuss with the farmers about Pelum's projects and objectives to strengthen the field work and prepare the final restitution and the further exercises. 3 public gatherings in different villages. Farmers asked questions about Pelum's work and way to intervene. Enhanced awareness about grouping together to implement projects.</td>
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<tr>
<td>25th of June - 5th of July</td>
<td>Week in Maseru to present to final results to the Pelum's staff. Analysis of data and final bibliography. Discuss about the main issues and the way to present to results to the farmers. Presentation of the final history, the economical analysis and discussion about the results. Presentation of the final history, the economical analysis and discussion about the results. Final comprehension and synthesis of the functioning of the agrarian system in the Matsoaing area. Discuss about the final step of the training.</td>
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<tr>
<td>5th - 11th July</td>
<td>Preparation of the final restitution for farmers. Having a clear synthesis of the main issues and conclusion in order to stimulate the discussion with farmers. Posters and drawing so as to enhance the transfer of knowledge to farmers and the capacity building.</td>
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<tr>
<td>12th of July</td>
<td>De-briefing with the farmers. Having the farmers be aware of the situation. Presentation with open questions, discussion about the main challenges. Discussion with farmers, validation of the results, awareness enhanced.</td>
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<tr>
<td>15th - 28th July</td>
<td>De-briefing and discussion with PELUM's staff, redaction of the thesis. Discussed about the finding and the next steps of the project. Conclusion of the work, redaction of a concept paper for UNDP Small Grant Program.</td>
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<tr>
<td>21st August - 22nd September</td>
<td>Meeting with director of thesis in France, discussion about the training and results, redaction of the thesis and final presentation.</td>
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</table>
Appendix 2. Guide to interviewing for technical and economic analysis

The questions are asked for a normal year (no climate disaster), and the datas are anonymous.

Presentation and composition of the family
Name of the farmer, place, date of the interview.
How many members are living in your household? How many are away? (temporary/all year long?)
How many work in the fields? How many are going to school?

- Questions for crop system analysis

  - Crop production

*Fields characteristics*
How many fields do you have? What is their size?
How did you get those fields? (inherited, from the chief)
Do you share those fields with your parents/brothers or are you the only household working on it and getting the harvest?
Where are they situated? (bank of river, flat area, steep slope, wheat or maize storey)
How far are they?
What kind of soil do you have in your fields?
What are the constraints due to those soils?
Do you have problems of soil erosion?
Agricultural planning on the fields (terraces, grass strips, furrows)?
What is the main weed affecting the yield? Do you have problems of diseases?

*Tools*
Which tools do you have?
Price, how long do they last?
If not plough, to whom do you borrow a plough? What is the arrangement?

*Crops cultivated*
What are the crops that you cultivate? What are the varieties?
How do you choose the location of the crops?
Do you grow vegetables? Are they on your fields or in a garden?
Do you have fruit trees?

*Crop association and rotation*
Do you do fallows? At which frequency?
Do you mix different crops on the same field? Are they on the same parcels or on different parcels?
What was the previous crops on that field?
How do you manage to keep the seed for the coming year, how do you choose the seeds to keep?

*Agricultural practices*
What are the different activities on the field and after the harvest?
Who does those activities? (men, women, herd-boy, hired person, letsema)
Who long does it take to do them and how many persons are required?
Which tools are used for each of those activities?
If persons are hired, how much are they paid?

*Fertility*
Do you fertilize on you fields/garden?
- **Products and expenses**
  Have you seen a decrease of your yield since you settled?
  How many bags/tins/bassins of each crop do you get from the different fields? Can you manage to feed all the family with those productions?
  What are the productions? (grains, stalks)
  What are the purposes of those productions (human consumption, animal feeding)? For which part of the plant?
  Do you exchange a part of your production? Which part?
  Do you buy seeds (notably for the vegetable garden)? Do you exchange seeds?
  Do you sell a part of your production? Where and how much?

*Others*
Do you work on others fields? At which frequency?
Are you paid with money of with a part of the crop?
Do you have a mill at home? Do you go to the mill to Mokhotlong, how much is it per tin?

- **Questions for livestock farming system analysis**

  - **Livestock management**

  *Flock and herd characteristics*
  Which species do you rear?
  Do you entrust somebody with your animals (*mafisa*)? Do you manage the animals of somebody who entrusted you with them? What is the arrangement?
  How many animals, sheep, cattle and goats, do you own, and how many do you manage of other owners?
  Age and sex of the animals.
  How many bulls, rams, billy goats do you have? Do you buy them or are they the progeny of your own animals?
  What is the purpose of those animals?
  Who takes the decisions for the flock and herd management?

  *Herd-boys*
  How many herd-boys do you hire? Are they your relatives?
  How do you pay them? With animals or with money?
  Are in charge of feeding them?
  Do you have a *motebo* on winter and summer pastures?

  *Mating*
  How do you manage the reproduction?
  When are the bulls, billy goat, rams, taken to the females?
  Do you control the mating or the non-castrated males are all year long with the flock?
  Until what age do you keep the rams, billy goats and bulls?
  At what age the cows, ewes and goats can get the males?
  Average age to replace the animals?
  Number of progeny per year, mortality rate for kids and adults.
  Calving-lambing-kidding interval.
  Did you experienced problems with Jackal or of stock theft?

  *Grazing and feeding*
  Where are the animals all over the year (grazing calendar).
  Which animals do you keep near the village during summer? For which purposes?
Do you give complementary food? To which animals and when? Which quantity per day? Do you have to buy supplementary food? Where? How much does it cost?

**Daily management**
- How many times do you take the animals to drink, and when?
- When are the animals taken to graze?
- Where do the animals with the grazing permit graze during summer?

**Medicine**
- What are the main problems of infections/diseases/parasites?
- When do you vaccinate the animals?
- Is there a national campaign for vaccination?
- How much do you spend for the medicine? Are you in charge of buying the medicine of the animals with which you were entrusted?

**Forage crops**
- Do you grow forage? What and which surface? Which quantity do you get and when do you give it to the animals? To which animals?

**Calendar of activities**
- What are the daily practices on the flock and how long does it take? Who does it?
- What are the intensive periods of activities (lambing, calving, kidding...), how long does it take and how many periods are required?

- **Products and expenses**
  - What are the different products you get? (fibres, meat, cow dung, draught power...)
  - How much milk do you get per day? From how many cows?

**Wool and Mohair marketing system**
- When is the shearing season?
- Where do you shear your animals (government shed or trader's shed)? How do you choose where to shear?
- Are you a member of the Wool and Mohair Grower Association? What are the fees involved?
- How much do you earn with all the animals you manage?
- If you shear at the government shed, when do you get paid by the BKB?

**Sales**
- How many animals are sold per year? Which ones? Where? How much?
- Which animals do you choose to sell first in case of need for cash?
- Is there a special moment you choose to sell the animals?

**Others**
- Do you have poultry? Who manages them?
- Do you buy some every year?
- How did you get them?
- Which food do you give them? Where do you buy it?
- Where do you sell them and how much?
- If no poultry, do you plan to do poultry production? Why can't you for the moment?

- **Additional information for economical analysis**
  - Do you have off-farm activities? (work in others' fields, brewing beer, collecting firewood, roofing)
  - Are those activities essentials to provide the family with enough money?
  - What are the expenses for the household per year (clothes, manufactures goods etc.)?
  - What is the food consumption per year for the household?
Appendix 3. Programme of interviews

The different crop and livestock management systems have been called as following:

- **CS1**: Crop system Maize + Beans in intercropping (M+B//M+B), mainly cultivation by hand (maize storey)
- **CS2**: Crop system Maize+Beans/Wheat/Barley (M+B/W/Barley) in the maize storey
- **CS3**: Crop system Wheat,Peas in multiple cropping (W,P/W,P), wheat storey
- **CS4**: Crop system Wheat,Peas/Wheat/Barley (W,P/W/Barley), wheat storey

- **LFS1**: Livestock Farming System of wool sheep (70 Merino sheep)
- **LFS2**: Livestock Farming System of mohair goats (60 Angora goats)
- **LFS3**: Livestock Farming System of 25 multi-purpose cattle
- **LFS4**: Livestock Farming System of meat sheep (1.720 mutton Merinos)
- **LFS5**: Livestock Farming System of 390 beef cattle

Moreover, the different farming systems are called:

- **FS1**: Subsistence farmers leaving agriculture (0,2 ha, CS1)
- **FS2**: Subsistence farming with structural recourse to off-farm activities (0,5 ha, CS1 or CS3)
- **FS3**: Subsistence farming with structural recourse to off-farm activities and owned animal given for mafisa (0,5 ha, CS1 or CS3 and about 15 sheep and goats)
- **FS4**: Mixed crop and livestock production, relying mainly on fibre production income. 70 Merino sheep (LFS1), 60 Angora goats (LFS2), 25 cattle (LFS3), (1,2 ha of CS2 or CS4).
- **FS5**: Large-scale livestock production for meat purpose. 1720 mutton Merino sheep (LFS4) and 390 cattle (LFS5).

Interviews about the history with the farmers managing different farming systems:

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsistence farmers leaving agriculture</td>
<td>3</td>
</tr>
<tr>
<td>Subsistence farmers with off-farm activities</td>
<td>5</td>
</tr>
<tr>
<td>Subsistence farmers with animals given for mafisa</td>
<td>4</td>
</tr>
<tr>
<td>Farmers doing mixed crop and livestock production</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>17</td>
</tr>
<tr>
<td>N°</td>
<td>Pasture management</td>
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</tbody>
</table>
Interviews of officers and official persons:
- The traditional chiefs and headmen of the villages in the Matsoaing area
- The district administrator in Mokhotlong
- The agricultural advisor of Matsoaing
- The district agricultural officer of Mokhotlong
- The officer of the Ministry of Forestry and Land Reclamation of Mokhotlong
- The director of marketing of the Livestock Products Marketing Services in Maseru
- The marketing assistant of the Livestock Products Marketing Services in Mokhotlong
- The Community Council secretary of Sehonghong
- The technical officer of the Ministry of Range Land in Mokhotlong
- The officer of the Ministry of Range Land in Mokhotlong

The shear-shed of the government (WMGA) and of the trader in Mokhotlong have been visited during the shearing season of the goats.
2 butcheries and 4 Chinese-owned shops of Mokhotlong have been visited to know the outlets for sheep, cattle, poultry and vegetables in town and the possibilities of agreements between sellers and farmers.
### Appendix 4. Agroecological characteristics of the main crops

(all data refer to cultivation by hand or tillage by animal traction in Africa) From Acland, 1973; Farnworth, 1997; Kochhar, 1981

<table>
<thead>
<tr>
<th>Specie</th>
<th>Uses</th>
<th>Temperature and water requirements</th>
<th>Altitude</th>
<th>Soil</th>
<th>Life cycle</th>
<th>Weeds/pests/disease control</th>
<th>Remarks</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zea mays</td>
<td>Maize</td>
<td>Ripen dried grains are used as main staple food, mainly milled to cook papa</td>
<td>Optimum growth occurs at 30°C. Under 10°C the growth stops. Highly sensitive to period of draught from 5 weeks to maturity</td>
<td>From 0 to 2.400 m.a.s.l depending on the varieties. &gt;2.400 m.a.s.l cool conditions severely limit yields</td>
<td>Well drained and reasonably fertile soil</td>
<td>About 7 to 8 months respectively at 1.800 m.a.s.l and 2.100 m.a.s.l</td>
<td>Seldom damaged by pests or disease and is virtually untouched by birds</td>
<td>Land preparation and weed control of high importance. Little labour required, notably for post-harvesting. Stover used for animal feeding</td>
</tr>
<tr>
<td>Triticum spp.</td>
<td>Wheat Koro</td>
<td>Ripe dried grains. Whole or flour used as staple food or bread</td>
<td>Tolerant to frost. A draught when tillering and at ear initiation restricts yields</td>
<td>Wheat is a temperate crop suited for elevation above 1.200 m in tropical area</td>
<td>Well drained with high nutrient content</td>
<td>Matures in 4 to 7 months. About 4.5 months at 2.100 m.a.s.l</td>
<td>Below 1.200 m humidity causes a high incidence of diseases</td>
<td>Farmers can use the seed which they produce the previous year</td>
</tr>
<tr>
<td>Phaseolus vulgaris</td>
<td>Beans Linaoa</td>
<td>Ripe dried seeds are used as condiment</td>
<td>Tolerant to 10-35°C, but sensitive to high temperature. Not drought resistant</td>
<td>Best suited for medium to high altitudes 900 to 2.700 m.a.s.1</td>
<td>Moist but well drained soil with moderate to high fertility</td>
<td>About 3 months. Up to 4 months at altitude 1.800 to 2.400 m</td>
<td>Sensitive to weeds &amp; humid conditions when flowering and harvesting</td>
<td>Can be sown in intercropping. Whole plant harvested. Vegetative parts can be used for animal feeding</td>
</tr>
<tr>
<td>Pisum sativum</td>
<td>Peas</td>
<td>Ripe dried seeds are used as condiment</td>
<td>Cool growing season: 13-18°C. Fair amount of rainfall</td>
<td>High altitude, above 2.000 m.a.s.1</td>
<td>Well drained soil of a reasonable level of fertility</td>
<td>From 3 to 4.5 months at high altitude</td>
<td>Sensitive to weeds &amp; humid conditions when flowering and harvesting</td>
<td>Partly harvested in an immature condition to be cooked as a vegetable</td>
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Appendix 5. Cropping calendars

### Cropping calendar of maize and beans, cultivation by hand

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<td><strong>Sowing</strong></td>
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<td>1) Handle hoeing</td>
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<td>2) By hand and using the sickle</td>
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<td>5 M.d</td>
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<td><strong>Harvesting:</strong></td>
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<td>Collecting the ears</td>
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<td>6 M.d</td>
<td>4 M.d</td>
<td>15 M.d</td>
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When mixed cropping with beans, all agricultural practices are the same; but beans are harvested separately.

Data per hectare
M.d Men. days
(M) Number of persons required to use the animal traction tools

### Cropping calendar of maize and beans, tillage by animal traction

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<tbody>
<tr>
<td><strong>Sowing</strong></td>
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<tr>
<td><strong>Harrowing</strong></td>
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<td><strong>Weeding:</strong></td>
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<tr>
<td>1) Handle hoeing</td>
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<td>15 M.d</td>
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<tr>
<td>2) Cultivating</td>
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<td>6 M.d</td>
<td>6 M.d</td>
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<tr>
<td><strong>Ridding</strong></td>
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<td><strong>Harvesting:</strong></td>
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</tr>
<tr>
<td>1) Cutting the maize and making heaps</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>10 M.d</td>
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<tr>
<td>2) Collecting the ears</td>
<td></td>
<td></td>
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<td></td>
<td>3-10 M.d</td>
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<tr>
<td>3) Collecting the stalks</td>
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</tbody>
</table>

When mixed cropping with beans, all agricultural practices are the same; but beans are harvested separately.

**Climatic conditions**
- **Maize growth stages**
  - Time for planting
  - 2 leaves
  - 5-6 leaves
  - Ear emergence
  - Perfect grain
  - Plant perfectly dry

**Rainy season**

**Risk of frost**
Cropping calendar of wheat, tillage by animal traction

<table>
<thead>
<tr>
<th>Time</th>
<th>A</th>
<th>S</th>
<th>O</th>
<th>N</th>
<th>D</th>
<th>J</th>
<th>F</th>
<th>M</th>
<th>A</th>
<th>M</th>
<th>J</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tillage: Ploughing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12 M.d (2 M)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Sowing: Broadcast sowing &amp; ploughing</td>
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<tr>
<td>Weeding by hand</td>
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<tr>
<td>Harvesting: 1) Cutting the wheat and making a heap 2) Threshing 3) Winnowing</td>
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<tr>
<td>Rainy season</td>
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<td>5-10 M.d</td>
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<tr>
<td>Risk of frost</td>
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<tr>
<td>Wheat growth stages</td>
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</tr>
<tr>
<td>Only at the wheat storey a previous land preparation and weeding are required.</td>
<td></td>
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</tr>
</tbody>
</table>

Note: due to the difference of climatic conditions, the life cycle of the wheat in the upper area is 3 weeks longer than down in the valley.

Cropping calendar of barley

<table>
<thead>
<tr>
<th>Time</th>
<th>A</th>
<th>S</th>
<th>O</th>
<th>N</th>
<th>D</th>
<th>J</th>
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<th>M</th>
<th>A</th>
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<th>J</th>
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</thead>
<tbody>
<tr>
<td>Tillage: Ploughing</td>
<td></td>
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<td>12 M.d (2 M)</td>
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<tr>
<td>Sowing: Broadcast sowing &amp; ploughing</td>
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<tr>
<td>Harvesting: 1) Cutting and making heap 2) Threshing 3) Collect the stalks 2nd crop cycle Sowing: Broadcast sowing &amp; ploughing</td>
<td></td>
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<tr>
<td>Only at the wheat storey</td>
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</tbody>
</table>

Cropping calendar of Peas, tillage by animal traction

<table>
<thead>
<tr>
<th>Time</th>
<th>A</th>
<th>S</th>
<th>O</th>
<th>N</th>
<th>D</th>
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</thead>
<tbody>
<tr>
<td>Tillage: Ploughing</td>
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<td>12 M.d (2 M)</td>
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</tr>
<tr>
<td>Sowing: Broadcast sowing &amp; ploughing</td>
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<tr>
<td>Harvesting by hand: 1) Few green peas 2) Dry peas</td>
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<tr>
<td>Only on the maize storey</td>
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</tbody>
</table>

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Appendix 6. Agricultural calendars of the crop systems

The work calendar of the crop systems are been made on the basis of 1 ha for each crop, intercropping or multiple cropping. The scale is different for each crop system due to the wide range of men.days required for each of them.

The CS1 is, except for the sowing, entirely done by cultivation by hand. Indeed the tillage and sowing requires a plough and oxens, hired from another farmer. The weeding and harvesting can be done by the family (two active farm workers and occasional help of a relative) and no collective work in required. The sowing time can be between September and November, as the farmers have to wait for the plough of others: it has been chosen to place the ploughing in October, as the majority of farmers having this crop system plough at that moment.

Unlike the CS1, the CS2 requires a collective for the harvest of the wheat.
Though, the harvest of barley, labour intensive as well, is done by the couple of farmers, the herd-boy taking care of the animal unit 1, and the farmers who have entrusted the farmer with their animals.

The CS3 is little labour-demanding but requires a collective work for the harvest of wheat. A plough is hired with a pair of oxen for the soil preparation in June and the broadcast sowing. As for the CS1, the sowing can stretches between September and November (even early December) due to the variety but also to the availability of the plough.

Like the CS2 and CS3, a collective work in necessary for the harvest of wheat, and the harvest of barley is done by the family, the herd-boy and the farmers who have entrusted them their animals.
Appendix 7. Functioning patterns of the flocks/herds

**Livestock farming system (1): functioning pattern**

- **LFS1: Functioning pattern of a flock of wool sheep** - small family farmer

  - Stock numbers: **68**
    - (Breeding ewes + Rams + Castrated males + Replacement ewes) (1)
  - Final stock numbers: **75**
    - (Stock numbers + Lambs – Exploited + Increased - Dead) (2)
  - Average stock numbers: **71,5**
    - ((1) + (2) / (3))
  - Natural increase: + **9,8%**
    - ((2) – (1) / (3))
  - Flock exploitation: **19,6%**
    - (Exploited / (3))
  - Death rates:
    - Adults (>15 months) **7%**
    - Kids (<12 months) **15%**
    - (number of death / size of age group)

  - Parturition rate=87%
  - Level of prolificacy=100%

**Composition of a sheep flock of the Malutis**

Small family farmers - wool sheep

- Breeding ewes **30**
- Rams **30**
- Replacement ewes **22**
- Males: lambs, adults **38**

- Flock: **70**

**Average stock numbers:** **71,5**

- Stock numbers:
  - (Breeding ewes + Rams + Castrated males + Replacement ewes)

- Final stock numbers:
  - (Stock numbers + Lambs – Exploited + Increased - Dead)

- Stock numbers:
  - (Breeding ewes + Rams + Castrated males + Replacement ewes)

- Final stock numbers:
  - (Stock numbers + Lambs – Exploited + Increased - Dead)

- Average stock numbers:
  - **71,5**

- Natural increase:
  - + **9,8%**

- Flock exploitation:
  - **19,6%**

- Death rates:
  - Adults (>15 months) **7%**
  - Kids (<12 months) **15%**
  - (number of death / size of age group)

- Parturition rate=87%
- Level of prolificacy=100%

**Livestock farming system (2): functioning pattern**

- **LFS2: Functioning pattern of a herd of mohair goats** - small family farmers

  - Stock number: **62**
    - (Breeding goats + Billy goats + Castrated males + Replacement goats) (1)
  - Final stock numbers: **66**
    - (Stock numbers + Kids – Exploited + Increased - Dead) (2)
  - Average stock numbers: **64**
    - ((1) + (2) / (3))
  - Natural increase:
    - + **6,3%**
    - ((2) – (1) / (3))
  - Herd exploitation: **21,1%**
    - (Exploited / (3))
  - Mortality rates:
    - Adults (>19 months) **8%**
    - Kids (<12 months) **16,6%**
    - (number of death / size of age group)

  - Parturition rate=80%
  - Level of prolificacy=100%

**Composition of a herd of goats of the Malutis**

Small family farmers - mohair goats

- Breeding goats **30**
- Male goats: Kids, adults **32**
- Female goats **20**

- Female kids **20**

- Herd:
  - **62**

**Average stock numbers:** **64**

- Stock numbers:
  - (Breeding goats + Billy goats + Castrated males + Replacement goats)

- Final stock numbers:
  - (Stock numbers + Kids – Exploited + Increased - Dead)

- Stock numbers:
  - (Breeding goats + Billy goats + Castrated males + Replacement goats)

- Final stock numbers:
  - (Stock numbers + Kids – Exploited + Increased - Dead)

- Average stock numbers:
  - **64**

- Natural increase:
  - + **6,3%**

- Flock exploitation:
  - **21,1%**

- Death rates:
  - Adults (>19 months) **8%**
  - Kids (<12 months) **16,6%**
  - (number of death / size of age group)

- Parturition rate=80%
- Level of prolificacy=100%
Livestock farming system (3): functioning pattern

**LFS3**: Functioning pattern of a herd of dual purpose cattle - small family farmer

- Stock numbers: 25,5
- (Cows + Bulls + Oxen + Heifers) (1)
- Final stock numbers: 27,8
- (Stock numbers + Calves - Exploited + Increased - Dead) (2)
- Average stock numbers: 26,7
- ((1) + (2) / 2) (3)
- Natural increase: + 8,6%
- ((2) - (1) / (3))
- Herd exploitation: 6,7%
- (Exploited / (3))
- Death rates:
  - Adults (>3 years) 2%
  - Calves (<1 year) 5%
- (number of death / size of age group)

Livestock farming system (4): functioning pattern

**LFS4**: Functioning pattern of a flock of meat sheep - Large herder

- Stock numbers: 1718
- (Breeding ewes + Rams + Castrated males + Replacement ewes) (1)
- Flock exploitation: 21%
- (Exploited / (1))
- Death rates:
  - Adults (>15 months) 7%
  - Kids (<12 months) 15%
- (number of death / size of age group)
Appendix 8. Grazing calendar

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(1) All animals, including the breeding bulls
(2) Animals allowed on the village’s grazing areas during winter
Appendix 9. Agricultural calendars for livestock management

For the farming system (4), the livestock farming systems are organized in two animal units according to the season. Each unit is conducted by a herd-boy. For that reason, it is more relevant to look at the work calendar for each livestock unit rather than for each livestock farming system, which would lead to count twice the time of work (watering and time on the pastures).

The animal unit 1 requires one full-time herd-boy. He has frequently the help of the children to milk the cows and go to the pastures and the livestock owner does the vaccination and calve castration with him.

Like the animal unit 1, the animal unit 2 requires a full-time herd-boy. The livestock owner helps occasionally the herd-boys during the lambing and kidding seasons (he goes to the pastures several times a week) and is also present when the sheep and goats are sheared.
Appendix 10. Work loads of the farming systems

The work calendars have been made by grouping the crop calendar adapted to the field area possessed and the livestock management calendar of the animal units (if necessary).

Due to the little area available for cropping and the absence of the husband, only one person works in the farming system (1).

As the farmer on the way of capitalization do not manage their animals, the work calendar of the farming systems 2 and 3 are the same. However, two working calendar have been made for the farming systems 2+3 and 4, one for the maize storey and one for the wheat storey, due to a different cropping calendar.

Two persons work on the farming systems 2 and 3.
On both maize and wheat storey, 4 persons work on the farming system (4): two members of the family and two herd-boys. Additional workers are hired for field work and the labour intensive activities (harvest) are done collectively.
Appendix 11. Economic indicators

For the economical analysis, different indicators have been used in order to evaluate the productivity of the crop and livestock management systems and then to evaluate the economical performances of the farming systems.

All the values are calculated in Maloti (1 Maloti = 0,09€), which is the national currency.

- For crop and livestock management systems assessment:

  The Gross Product (GP) is the monetary value of the final products. It is calculate by adding the different productions, multiplied by their price per unit. Since the products are self-consumed, their value is included at the one in the shops of Mokhotlong. The prices are those of the current year, and the yields are those which are the most common.

  The Inputs represent the value of the seeds for crop systems and of supplementary food, medicine and other needs for livestock system. For the price of the seeds, it is more relevant to estimate it from the price of the grains in the shop, because the traditional varieties are not available on the market. Only the improved varieties are found in the shop and are at an unaffordable price.

  The Gross Added Value (GAV) is the difference between the gross product and the inputs and corresponds to the wealth produced by a system.

  The gross added value is then calculated per hectare for the crop systems or per animal for the livestock management systems, the land productivity (GAV/ha or GAV/animal) and per men.days of work, labour productivity (GAV/md). Those productivities enable to compare the systems together. For the crop systems involving a crop rotation on several years, the GAV/ha and GAV/ men.days are calculated for each crop or crop association, then those GAV are summed and divided by the number of years of the rotation cycle.

  The men. days are calculated from the cropping calendar: one man.day represents one man working 6 hours during a day.

Exemple:
- if one man works 8 days alone, it is 8 men.days.
- if 8 men work on the field during one day, it is 8 men.days

- For farming systems assessment:

  The Net Added Value (NAV) is the sum of the different gross added values of the productions, to which the economical depreciation of the fix or biological capital is deducted (current value of the investment/duration of use).

  The Agricultural Income (RA) illustrates the payment of the agricultural labour to the family after the payment of the different salaries (hired persons, taxes and fees for the state). This income enables to compare the farming systems together. The incomes from off-farm activities are not included.
Appendix 12. Calculation of the survival threshold

The calculation of the survival threshold has been made upon the base of a family composed of 6 persons, with 2 agricultural work force and 4 dependents: 3 children and one grand-parent. This family scheme is the most frequent one in the Maloti mountains and it has been verified with the National Budget Survey of 2006, where it is mentioned that in rural mountains of Lesotho, the dependency ratio is 0.9.

In that survey, for a family of 6 persons, the poverty line is 7,992 Malotis. The calculation is made upon the fact that an equivalent adult needs 150 Malotis par month and the family is composed of:
- one child of 1-3 years old: 0,48 equivalent adult
- one child of 4-6 years old: 0,63 eq. adult
- one child of 7-10 years old: 0,69 eq. adult
- one adult male: 1 eq. adult
- one adult female: 0,74 eq. adult
- one elder of 50-75 years old: 0,7 eq. adult

Since the Matsoaing area is one of the most remote area of Lesotho, it has proven to be relevant to calculate survival threshold adapted to the local conditions, food consumption and needs.

<table>
<thead>
<tr>
<th>Food</th>
<th>Annual consumption</th>
<th>Unit</th>
<th>Price per unit (Maloti)</th>
<th>Total per family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize meal</td>
<td>10</td>
<td>Bag of 80 kg</td>
<td>250</td>
<td>2500</td>
</tr>
<tr>
<td>Wheat meal</td>
<td>2</td>
<td>Bag of 80 kg</td>
<td>280</td>
<td>560</td>
</tr>
<tr>
<td>Sugar</td>
<td>12</td>
<td>Kg</td>
<td>7,5</td>
<td>90</td>
</tr>
<tr>
<td>Salt</td>
<td>6</td>
<td>Kg</td>
<td>7,5</td>
<td>45</td>
</tr>
<tr>
<td>Peas</td>
<td>30</td>
<td>Kg</td>
<td>12,5</td>
<td>375</td>
</tr>
<tr>
<td>Beans</td>
<td>30</td>
<td>Kg</td>
<td>11</td>
<td>330</td>
</tr>
<tr>
<td>Cabbages</td>
<td>75</td>
<td>Units</td>
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<td>375</td>
</tr>
<tr>
<td>Potatoes</td>
<td>30</td>
<td>Kg</td>
<td>3</td>
<td>90</td>
</tr>
<tr>
<td>Edible Oil</td>
<td>24</td>
<td>Liters</td>
<td>21,5</td>
<td>516</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
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<td><strong>4881</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Basic utensils</th>
<th>Annual consumption</th>
<th>Unit</th>
<th>Price per unit (Maloti)</th>
<th>Total per family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bucket</td>
<td>For 5 years</td>
<td>Unit</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>Bassin</td>
<td>For 5 years</td>
<td>Unit</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>Cup</td>
<td>For 5 years</td>
<td>Unit</td>
<td>4,5</td>
<td>0,9</td>
</tr>
<tr>
<td>Plate</td>
<td>For 5 years</td>
<td>Unit</td>
<td>9</td>
<td>1,8</td>
</tr>
<tr>
<td>Cooking pot</td>
<td>For 15 years</td>
<td>Unit</td>
<td>845</td>
<td>56,3</td>
</tr>
<tr>
<td>Candles</td>
<td>104 (2 per week)</td>
<td>Unit</td>
<td>1,5</td>
<td>156</td>
</tr>
<tr>
<td>Parrafin</td>
<td>5</td>
<td>Liters</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>Matches</td>
<td>40</td>
<td>Box</td>
<td>0,3</td>
<td>12</td>
</tr>
<tr>
<td>Soap</td>
<td>3 long pieces</td>
<td>Unit</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Vaselin</td>
<td>1 per month</td>
<td>Pot</td>
<td>10</td>
<td>120</td>
</tr>
<tr>
<td>Washing powder</td>
<td>1 per month</td>
<td>Kg</td>
<td>26</td>
<td>312</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>725</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clothes</th>
<th>Annual consumption</th>
<th>Unit</th>
<th>Price per unit (Maloti)</th>
<th>Total per family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blanket</td>
<td>1</td>
<td>Unit</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Rubber boots for adults</td>
<td>1 every 2 years</td>
<td>Pair</td>
<td>80</td>
<td>40</td>
</tr>
<tr>
<td>Rubber boots for kids</td>
<td>1</td>
<td>Pair</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>T-shirt</td>
<td>1</td>
<td>Unit</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Trousers</td>
<td>1</td>
<td>Unit</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>350</strong></td>
</tr>
</tbody>
</table>

**SURVIVAL THRESHOLD** 5956

per active farm worker 2978
Appendix 13. The gross added value of the crop systems and livestock farming systems

### WHITE MAIZE+BEANS (1ha)

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains Maize</td>
<td>Bag 80kg</td>
<td>10</td>
<td>250</td>
<td>2500</td>
</tr>
<tr>
<td>Stovers</td>
<td>Kg 200</td>
<td>11</td>
<td>2200</td>
<td></td>
</tr>
<tr>
<td>Beans</td>
<td>Kg 200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>4900</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### INTAKES

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeds Maize</td>
<td>Bag 80kg</td>
<td>1</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Seeds Beans</td>
<td>Kg 40</td>
<td>11</td>
<td>440</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>690</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GAV/ha** 4210

### WHEAT (0.9 ha), PEAS (0.1ha), wheat storey

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains Wheat</td>
<td>Bag 80kg</td>
<td>22,5</td>
<td>280</td>
<td>6300</td>
</tr>
<tr>
<td>Peas</td>
<td>Kg 20</td>
<td>12,5</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>6550</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### INTAKES

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeds Wheat</td>
<td>Bag 80kg</td>
<td>1,35</td>
<td>280</td>
<td>378</td>
</tr>
<tr>
<td>Seeds Peas</td>
<td>Kg 7</td>
<td>7,5</td>
<td>52,5</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>430,5</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GAV/ha** 6119.5

### WHEAT (maize + wheat storey) (1ha)

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains Wheat</td>
<td>Bag 80kg</td>
<td>25</td>
<td>280</td>
<td>7000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>7000</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### INTAKES

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeds Wheat</td>
<td>Bag 80kg</td>
<td>1,5</td>
<td>280</td>
<td>420</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>420</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GAV/ha** 6580

### BARLEY (1ha)

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains Barley</td>
<td>Bag 80kg</td>
<td>18</td>
<td>280</td>
<td>5040</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>5540</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### INTAKES

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeds Barley</td>
<td>Bag 80kg</td>
<td>4</td>
<td>280</td>
<td>1120</td>
</tr>
<tr>
<td><strong>TOTAL 1</strong></td>
<td></td>
<td><strong>1120</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL 2 (1 sowing)</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>560</strong></td>
</tr>
</tbody>
</table>

**GAV/ha (maize st.)** 4420

**GAV/ha (wheat st.)** 4980

### GAV/ha of the crop systems

| CS1: Maize+Beans | 4210 |
| CS2: M+Beans//W//Barley | 5070 |
| CS3: Wheat//Peas | 6119.5 |
| CS4: W,Peas//W//Barley | 5893.17 |

<table>
<thead>
<tr>
<th>Crops</th>
<th>Men.days</th>
<th>GAV/men.days of crop systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>maize + beans</td>
<td>130</td>
<td>CS1: Maize+Beans 32.38</td>
</tr>
<tr>
<td>wheat (wheat storey)</td>
<td>119</td>
<td>CS2: M+Beans//W//Barley 44.47</td>
</tr>
<tr>
<td>wheat (maize storey)</td>
<td>103</td>
<td>CS3: Wheat//Peas 55.18</td>
</tr>
<tr>
<td>wheat and peas</td>
<td>110,9</td>
<td>CS4: W,Peas//W//Barley 52.48</td>
</tr>
<tr>
<td>barley (wheat storey)</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td>barley (maize storey)</td>
<td>109</td>
<td></td>
</tr>
</tbody>
</table>
### Livestock farming system 1: wool sheep (70 sheep)

#### GROSS PRODUCTS

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Qty</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wool (M90/sheep)</td>
<td>price/sheep</td>
<td>70</td>
<td>90</td>
<td>6300</td>
</tr>
<tr>
<td>Sales (old males/ewes)</td>
<td>Sheep</td>
<td>7</td>
<td>600</td>
<td>4200</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>10500</strong></td>
</tr>
</tbody>
</table>

#### INTAKES

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Qty</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>niclosamide, 10ml/sheep</td>
<td>Litre</td>
<td>0.7</td>
<td>700</td>
<td>490</td>
</tr>
<tr>
<td>For Enterotoxemia, 4ml/adult</td>
<td>Litre</td>
<td>0.27</td>
<td>600</td>
<td>162</td>
</tr>
<tr>
<td><strong>Supplementary food</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salt (1,5kg/sheep)</td>
<td>Bag 50kg</td>
<td>2.1</td>
<td>60</td>
<td>126</td>
</tr>
<tr>
<td>Barley</td>
<td>Bag 50kg</td>
<td>2</td>
<td>280</td>
<td>560</td>
</tr>
<tr>
<td>Sheep pellets</td>
<td>Bag 50kg</td>
<td>1</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Wheat bran</td>
<td>Bag 50kg</td>
<td>0.5</td>
<td>130</td>
<td>65</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>1553</strong></td>
</tr>
</tbody>
</table>

**GAV / sheep** 131.57

### Livestock farming system 2: mohair goats (60 goats)

#### GROSS PRODUCTS

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Qty</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mohair (M47/goat)</td>
<td>price/head</td>
<td>60</td>
<td>47</td>
<td>2820</td>
</tr>
<tr>
<td>Sales (old goats)</td>
<td>Goat</td>
<td>7</td>
<td>400</td>
<td>2800</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>5620</strong></td>
</tr>
</tbody>
</table>

#### INTAKES

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Qty</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>niclosamide, 10ml/goat</td>
<td>Litre</td>
<td>0.6</td>
<td>700</td>
<td>420</td>
</tr>
<tr>
<td>For Enterotoxemia, 4ml/adult</td>
<td>Litre</td>
<td>0.25</td>
<td>600</td>
<td>150</td>
</tr>
<tr>
<td><strong>Supplementary food</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salt (1,5kg/goat)</td>
<td>Bag 50kg</td>
<td>1.95</td>
<td>60</td>
<td>117</td>
</tr>
<tr>
<td>Barley</td>
<td>Bag 50kg</td>
<td>2</td>
<td>280</td>
<td>560</td>
</tr>
<tr>
<td>Sheep pellets</td>
<td>Bag 50kg</td>
<td>1</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Wheat bran</td>
<td>Bag 50kg</td>
<td>0.5</td>
<td>130</td>
<td>65</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>1453</strong></td>
</tr>
</tbody>
</table>

**GAV / goat** 67.21

### Livestock farming system 3: dual purpose cattle (25 cattle)

#### GROSS PRODUCTS

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Qty</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale Oxen+Old cow</td>
<td>Cattle</td>
<td>2</td>
<td>2500</td>
<td>5000</td>
</tr>
<tr>
<td>Milk, 2L/day</td>
<td>Litre</td>
<td>730</td>
<td>2.5</td>
<td>1825</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>6825</strong></td>
</tr>
</tbody>
</table>

#### INTAKES

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Qty</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecomycin (bottle 25ml)</td>
<td>Bottle</td>
<td>2</td>
<td>60</td>
<td>120</td>
</tr>
<tr>
<td>Niclosamide, 80ml/cattle</td>
<td>Litre</td>
<td>2</td>
<td>700</td>
<td>1400</td>
</tr>
<tr>
<td>Against Enterotoxemia</td>
<td>Litre</td>
<td>0.26</td>
<td>600</td>
<td>156</td>
</tr>
<tr>
<td>(2x5ml/adult)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Supplementary food</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salt (3.5kg/cattle)</td>
<td>Bag 50kg</td>
<td>1.75</td>
<td>60</td>
<td>105</td>
</tr>
<tr>
<td>maize/barley stalks</td>
<td></td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horse and Poney cubes</td>
<td>Bag 50kg</td>
<td>2</td>
<td>130</td>
<td>130</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milking Cream</td>
<td>Pot 250ml</td>
<td>2</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>2329</strong></td>
</tr>
</tbody>
</table>

**GAV / cattle** 172.92

### Livestock farming system 4: beef cattle (390 cattle)

#### GROSS PRODUCT

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Qty</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales cattle in RSA</td>
<td>Cattle</td>
<td>57</td>
<td>2500</td>
<td>142500</td>
</tr>
<tr>
<td>Sales cattle butchery</td>
<td>Cattle</td>
<td>57</td>
<td>8000</td>
<td>456000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>598500</strong></td>
</tr>
</tbody>
</table>

#### INTAKES

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Qty</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecomycin</td>
<td>bottle 25ml</td>
<td>6</td>
<td>60</td>
<td>360</td>
</tr>
<tr>
<td>Niclosamide, 2x50ml/catt</td>
<td>Litre</td>
<td>19.5</td>
<td>700</td>
<td>13650</td>
</tr>
<tr>
<td>For Enterotoxemia</td>
<td>Litre</td>
<td>3.8</td>
<td>600</td>
<td>2280</td>
</tr>
<tr>
<td><strong>Supp. food cattle</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minerals (0.5bag/day)</td>
<td>Bag 50kg</td>
<td>182.5</td>
<td>60</td>
<td>10950</td>
</tr>
<tr>
<td>Salt</td>
<td>Bag 50kg</td>
<td>50</td>
<td>60</td>
<td>3000</td>
</tr>
<tr>
<td>Maize and Barley stalks</td>
<td></td>
<td>1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheat bran</td>
<td>Bag 50kg</td>
<td>2</td>
<td>130</td>
<td>260</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>31500</strong></td>
</tr>
</tbody>
</table>

**GAV/beef cattle** 1461.34

### Livestock farming system 5: meat sheep (1720 sheep)

#### GROSS PRODUCT

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Qty</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales males sheep</td>
<td>Sheep</td>
<td>315</td>
<td>900</td>
<td>283500</td>
</tr>
<tr>
<td>Sales old ewes</td>
<td>Ewe</td>
<td>315</td>
<td>600</td>
<td>189000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>472500</strong></td>
</tr>
</tbody>
</table>

#### INTAKES

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Qty</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ivermectin,M1.3/sheep</td>
<td>Injection</td>
<td>1720</td>
<td>1.3</td>
<td>2236</td>
</tr>
<tr>
<td>Niclosamide, 6ml/sheep</td>
<td>Litre</td>
<td>10.3</td>
<td>700</td>
<td>7210</td>
</tr>
<tr>
<td>For Enterotoxemia</td>
<td>Litre</td>
<td>3.5</td>
<td>600</td>
<td>2100</td>
</tr>
<tr>
<td><strong>Supp. Food sheep</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minerals (1bag/week)</td>
<td>Bag 50kg</td>
<td>52</td>
<td>60</td>
<td>3120</td>
</tr>
<tr>
<td>Salt</td>
<td>Bag 50kg</td>
<td>50</td>
<td>60</td>
<td>3000</td>
</tr>
<tr>
<td>barley</td>
<td>Bag 50kg</td>
<td>10</td>
<td>280</td>
<td>2800</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>20466</strong></td>
</tr>
</tbody>
</table>

**GAV/meat sheep** 263.12
Appendix 14. The agricultural income

The calculations of the agricultural income have been made for each farming system. Except for the Farming system (1) (Farmers leaving agriculture and relying mainly on non-agricultural activities), who is always in the maize storey, the calculations have been made, for each farming system, for both maize and wheat storey. Indeed, although the functioning of the system and the farmer strategies are similar, the difference between the yield for maize or wheat makes the result a bit different.

For that reason, the calculation are to enhance the fact that an hectare of wheat produced more wealth than one of maize. The calculation for off-farm activities are the followings:

The calculation for off-farm activities are the followings:

<table>
<thead>
<tr>
<th>Activity of FS1</th>
<th>Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off-farm activity FS1</td>
<td>7000</td>
</tr>
<tr>
<td>TOTAL per active farm worker</td>
<td>3500</td>
</tr>
</tbody>
</table>

The calculation for the agricultural income of each farming system are the followings:

<table>
<thead>
<tr>
<th>Farming system 1 (CS1)</th>
<th>Maize+Beans 0.2ha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GROSS PRODUCT</strong></td>
<td></td>
</tr>
<tr>
<td>Product</td>
<td>Unit</td>
</tr>
<tr>
<td>Maize</td>
<td>Bag 80kg</td>
</tr>
<tr>
<td>Beans</td>
<td>Kg</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
</tr>
<tr>
<td><strong>INTAKES</strong></td>
<td></td>
</tr>
<tr>
<td>Product</td>
<td>Unit</td>
</tr>
<tr>
<td>Seeds maize</td>
<td>Bag 80kg</td>
</tr>
<tr>
<td>Seeds beans</td>
<td>Kg</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
</tr>
<tr>
<td><strong>REDEMPTION</strong></td>
<td></td>
</tr>
<tr>
<td>Tool</td>
<td>Quantity</td>
</tr>
<tr>
<td>Sickle</td>
<td>1</td>
</tr>
<tr>
<td>Handle hoe</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
</tr>
<tr>
<td><strong>CHARGES</strong></td>
<td></td>
</tr>
<tr>
<td>Hires to plough</td>
<td>Maluti/ha</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
</tr>
<tr>
<td><strong>NAV</strong></td>
<td></td>
</tr>
<tr>
<td>Agricultural Income</td>
<td></td>
</tr>
<tr>
<td>Income per farmer</td>
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</table>
### Farming system 2 (CS1) Maize storey

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>Bag 80kg</td>
<td>5</td>
<td>250</td>
<td>1250</td>
</tr>
<tr>
<td>Beans</td>
<td>Kg</td>
<td>100</td>
<td>11</td>
<td>1100</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>2350</strong></td>
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</table>

### INTAKES

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeds maize</td>
<td>Bag 80kg</td>
<td>0.5</td>
<td>250</td>
<td>125</td>
</tr>
<tr>
<td>Seeds beans</td>
<td>Kg</td>
<td>20</td>
<td>11</td>
<td>220</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
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<td></td>
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### REDEMPTION

<table>
<thead>
<tr>
<th>Tool</th>
<th>Quantity</th>
<th>Price</th>
<th>Duration of use</th>
<th>Redemption/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sickle</td>
<td>2</td>
<td>50</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>Handle hoe</td>
<td>1</td>
<td>32.5</td>
<td>50</td>
<td>0.65</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
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<td><strong>2.65</strong></td>
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</table>

### CHARGES

<table>
<thead>
<tr>
<th>Hire to plough</th>
<th>Maluti/ha</th>
<th>Maluti/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hires to plough</td>
<td>0.5ha</td>
<td>M400/ha</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NAV</th>
<th>Agricultural Income</th>
<th>Income per farmer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002.35</td>
<td>1802.35</td>
<td>901.18</td>
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### Farming system 2 (CS3) Wheat storey

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>Bag 80kg</td>
<td>11.25</td>
<td>280</td>
<td>3150</td>
</tr>
<tr>
<td>Peas</td>
<td>Kg</td>
<td>10</td>
<td>12.5</td>
<td>125</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>3275</strong></td>
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</tbody>
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### INTAKES

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeds maize</td>
<td>Bag 80kg</td>
<td>0.68</td>
<td>280</td>
<td>189</td>
</tr>
<tr>
<td>Seeds beans</td>
<td>Kg</td>
<td>3.5</td>
<td>12.5</td>
<td>43.75</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>232.75</strong></td>
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### REDEMPTION

<table>
<thead>
<tr>
<th>Tool</th>
<th>Quantity</th>
<th>Price</th>
<th>Duration of use</th>
<th>Redemption/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sickle</td>
<td>2</td>
<td>50</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>Handle hoe</td>
<td>1</td>
<td>32.5</td>
<td>50</td>
<td>0.65</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>2.65</strong></td>
</tr>
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</table>

### CHARGES

<table>
<thead>
<tr>
<th>Hire to plough</th>
<th>Maluti/ha</th>
<th>Maluti/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hires to plough</td>
<td>0.5ha</td>
<td>M400/ha</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NAV</th>
<th>Agricultural Income</th>
<th>Income per farmer</th>
</tr>
</thead>
<tbody>
<tr>
<td>3039.6</td>
<td>2839.6</td>
<td>1419.8</td>
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</table>
### Farming system 3 (CS1) Maize storey

#### GROSS PRODUCT
<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>Bag 80kg</td>
<td>5</td>
<td>250</td>
<td>1250</td>
</tr>
<tr>
<td>Beans</td>
<td>Kg</td>
<td>100</td>
<td>11</td>
<td>1100</td>
</tr>
<tr>
<td>Sales sheep</td>
<td>Animal</td>
<td>1</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>2950</strong></td>
</tr>
</tbody>
</table>

#### INTAKES
<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeds maize</td>
<td>Bag 80kg</td>
<td>0,5</td>
<td>250</td>
<td>125</td>
</tr>
<tr>
<td>Seeds beans</td>
<td>Kg</td>
<td>20</td>
<td>11</td>
<td>220</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>345</strong></td>
</tr>
</tbody>
</table>

#### REDEMPTION
<table>
<thead>
<tr>
<th>Tool</th>
<th>Quantity</th>
<th>Price</th>
<th>Duration of use</th>
<th>Redemption/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sickle</td>
<td>2</td>
<td>50</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>Handle hoe</td>
<td>1</td>
<td>32,5</td>
<td>50</td>
<td>0,65</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>2,65</strong></td>
</tr>
</tbody>
</table>

#### CHARGES
| Hire to plough  | Maluti/ha | 0,5ha | M400/ha | 200   |
| Registration fee (10 animals) | Fee | 10 | 4 | 40 |
| **TOTAL**       |          |       |         | **240**|

| NAV             |          |       |         | **2602,35**|
| Agricultural Income |          |       |         | **2362,35**|
| Income per farmer   |          |       |         | **1181,18**|

### Farming system 3 (CS3) Wheat storey

#### GROSS PRODUCT
<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>Bag 80kg</td>
<td>11,25</td>
<td>280</td>
<td>3150</td>
</tr>
<tr>
<td>Beans</td>
<td>Kg</td>
<td>10</td>
<td>12,5</td>
<td>125</td>
</tr>
<tr>
<td>Sales sheep</td>
<td>Animal</td>
<td>1</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>3875</strong></td>
</tr>
</tbody>
</table>

#### INTAKES
<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeds maize</td>
<td>Bag 80kg</td>
<td>0,68</td>
<td>280</td>
<td>189</td>
</tr>
<tr>
<td>Seeds peas</td>
<td>Kg</td>
<td>3,5</td>
<td>12,5</td>
<td>43,75</td>
</tr>
<tr>
<td>Registration fee (10 animals)</td>
<td>Fee</td>
<td>10</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>272,75</strong></td>
</tr>
</tbody>
</table>

#### REDEMPTION
<table>
<thead>
<tr>
<th>Tool</th>
<th>Quantity</th>
<th>Price</th>
<th>Duration of use</th>
<th>Redemption/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sickle</td>
<td>2</td>
<td>50</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>Handle hoe</td>
<td>1</td>
<td>32,5</td>
<td>50</td>
<td>0,65</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>2,65</strong></td>
</tr>
</tbody>
</table>

#### CHARGES
| Hire to plough  | Maluti/ha | 0,5ha | M400/ha | 200   |
| Registration fee (10 animals) | Fee | 10 | 4 | 40 |
| **TOTAL**       |          |       |         | **200**|

| NAV             |          |       |         | **3599,6**|
| Agricultural Income |          |       |         | **3399,6**|
| Income per farmer   |          |       |         | **1699,8**|
### GROSS PRODUCT

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crops</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White maize grains</td>
<td>Bag 80kg</td>
<td>4</td>
<td>250</td>
<td>1000</td>
</tr>
<tr>
<td>Maize stovers</td>
<td>Kg</td>
<td></td>
<td>1500</td>
<td></td>
</tr>
<tr>
<td>Wheat grains</td>
<td>Bag 80kg</td>
<td>10</td>
<td>280</td>
<td>2800</td>
</tr>
<tr>
<td>Beans</td>
<td>Kg</td>
<td>80</td>
<td>11</td>
<td>880</td>
</tr>
<tr>
<td>Barley</td>
<td>Bag 80kg</td>
<td>7,2</td>
<td>280</td>
<td>2016</td>
</tr>
<tr>
<td>Barley stalks/standing forage</td>
<td>Bag 80kg</td>
<td>7,2</td>
<td>280</td>
<td>2016</td>
</tr>
<tr>
<td>Livestock</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sale Oxen+Old cow</td>
<td>Cattle</td>
<td>2</td>
<td>2500</td>
<td>5000</td>
</tr>
<tr>
<td>Milk, 2L/day</td>
<td>Ltr</td>
<td>730</td>
<td>2,5</td>
<td>1825</td>
</tr>
<tr>
<td>Wool (M90/sheep)</td>
<td>Price/sheep</td>
<td>70</td>
<td>90</td>
<td>6300</td>
</tr>
<tr>
<td>Sales (old males/ewes)</td>
<td>Sheep</td>
<td>7</td>
<td>600</td>
<td>4200</td>
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<tr>
<td>Mohair (M47/goat)</td>
<td>Price/goat</td>
<td>60</td>
<td>47</td>
<td>2820</td>
</tr>
<tr>
<td>Sales (old goats)</td>
<td>Goat</td>
<td>7</td>
<td>400</td>
<td>2800</td>
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</table>

#### INTAKES

<table>
<thead>
<tr>
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<th>Unit</th>
<th>Qty</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crops</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White maize seeds</td>
<td>Bag 80kg</td>
<td>0,4</td>
<td>250</td>
<td>100</td>
</tr>
<tr>
<td>Wheat seeds</td>
<td>Bag 80kg</td>
<td>0,6</td>
<td>280</td>
<td>168</td>
</tr>
<tr>
<td>Beans</td>
<td>Kg</td>
<td>16</td>
<td>11</td>
<td>176</td>
</tr>
<tr>
<td>Barley</td>
<td>Bag 80kg</td>
<td>1,6</td>
<td>280</td>
<td>448</td>
</tr>
<tr>
<td>Livestock</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicine cattle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecomycin (25ml)</td>
<td>Bottle</td>
<td>2</td>
<td>60</td>
<td>120</td>
</tr>
<tr>
<td>Nicosamide (2x40ml/cattle)</td>
<td>Ltr</td>
<td>2</td>
<td>700</td>
<td>1400</td>
</tr>
<tr>
<td>For Enterotoxemia (2x5ml/adult)</td>
<td>Ltr</td>
<td>0,26</td>
<td>600</td>
<td>156</td>
</tr>
<tr>
<td>Medicine sheep</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nicosamide (2x5ml/sheep)</td>
<td>Ltr</td>
<td>0,7</td>
<td>700</td>
<td>490</td>
</tr>
<tr>
<td>For Enterotoxemia (2x2ml/adult)</td>
<td>Ltr</td>
<td>0,27</td>
<td>600</td>
<td>162</td>
</tr>
<tr>
<td>Medicine goats</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nicosamide (2x5ml/goat)</td>
<td>Ltr</td>
<td>0,6</td>
<td>700</td>
<td>420</td>
</tr>
<tr>
<td>For Enterotoxemia (2x2ml/adult)</td>
<td>Ltr</td>
<td>0,25</td>
<td>600</td>
<td>150</td>
</tr>
<tr>
<td>Supp. food cattle</td>
<td>Bag 50Kg</td>
<td>1,75</td>
<td>60</td>
<td>105</td>
</tr>
<tr>
<td>Supp. Food sheep</td>
<td>Bag 50Kg</td>
<td>2.1</td>
<td>60</td>
<td>126</td>
</tr>
<tr>
<td>Salt (3,5kg/cattle)</td>
<td>Kg</td>
<td>2</td>
<td>150</td>
<td>300</td>
</tr>
<tr>
<td>Maize/Barley stalks</td>
<td>Bag 50Kg</td>
<td>2</td>
<td>130</td>
<td>260</td>
</tr>
<tr>
<td>Wheat bran</td>
<td>Bag 50Kg</td>
<td>2</td>
<td>170</td>
<td>340</td>
</tr>
<tr>
<td>Horse-Poney cubes</td>
<td>Bag 50Kg</td>
<td>1.5</td>
<td>130</td>
<td>65</td>
</tr>
<tr>
<td>Supp. Food goats</td>
<td>Bag 50Kg</td>
<td>1.8</td>
<td>130</td>
<td>65</td>
</tr>
<tr>
<td>Salt (1,5kg/goat)</td>
<td>Bag 50Kg</td>
<td>2</td>
<td>150</td>
<td>300</td>
</tr>
<tr>
<td>Barley</td>
<td>Bag 50Kg</td>
<td>0.5</td>
<td>130</td>
<td>65</td>
</tr>
<tr>
<td>Sheep pellets</td>
<td>Bag 50Kg</td>
<td>1</td>
<td>130</td>
<td>65</td>
</tr>
<tr>
<td>Wheat bran</td>
<td>Bag 50Kg</td>
<td>0.5</td>
<td>130</td>
<td>65</td>
</tr>
</tbody>
</table>

### CHARGES

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herdboy</td>
<td></td>
<td>2</td>
<td>2500</td>
<td>5000</td>
</tr>
<tr>
<td>Food: maize meal</td>
<td>Bag 80Kg</td>
<td>16</td>
<td>250</td>
<td>4000</td>
</tr>
<tr>
<td>Blanket</td>
<td>Unit</td>
<td>1</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Rubber boots</td>
<td>Pair</td>
<td>2</td>
<td>80</td>
<td>160</td>
</tr>
<tr>
<td>Membership</td>
<td></td>
<td>1</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Registration fee (M4/animal)</td>
<td>Animal</td>
<td>155</td>
<td>4</td>
<td>620</td>
</tr>
<tr>
<td>Shearing registration (M0,5/animal)</td>
<td>Sheep/</td>
<td>130</td>
<td>0.5</td>
<td>65</td>
</tr>
<tr>
<td>Fee for shearing (M1/animal)</td>
<td>Maloti</td>
<td>130</td>
<td>1</td>
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<td>M1/kg wool-mohair (1,1kg/goat - 2,9kg/sheep)</td>
<td>Kg</td>
<td>265,4</td>
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<tr>
<td>Weeding</td>
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<td>300</td>
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<td>Letsema (1 basin/woman)</td>
<td>Basin</td>
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#### REDEMPTION

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<tr>
<td>Plough</td>
<td>1</td>
<td>1845</td>
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</tr>
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<td>Share of plough</td>
<td>1</td>
<td>100</td>
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<td>Cultivator</td>
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</tr>
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<td>Harrow</td>
<td>1</td>
<td>1255</td>
<td>50</td>
</tr>
<tr>
<td>Yoke</td>
<td>1</td>
<td>520</td>
<td>15</td>
</tr>
<tr>
<td>Sickle</td>
<td>2</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>Handle Hoe</td>
<td>1</td>
<td>32,5</td>
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<tr>
<td>Livestock</td>
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</tr>
<tr>
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<td>1000</td>
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<tr>
<td>Motebo</td>
<td>2</td>
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<tr>
<td>Kraal</td>
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<td>500</td>
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<tr>
<td>Syringe</td>
<td>1</td>
<td>6</td>
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<td>Bucket for milk</td>
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<td>Ram Merino</td>
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<td>Billy goat</td>
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#### NAV

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<tr>
<td>------------------</td>
<td>---------------</td>
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<td><strong>Crops</strong></td>
<td>Wheat grains</td>
</tr>
<tr>
<td></td>
<td>Peas</td>
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<td>Barley</td>
</tr>
<tr>
<td></td>
<td>Barley stalks</td>
</tr>
<tr>
<td><strong>Livestock</strong></td>
<td>Sale Oxen+Old cow</td>
</tr>
<tr>
<td></td>
<td>Milk, 2L/day</td>
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<tr>
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<td>Wool (M90/sheep)</td>
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<tr>
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<td>Sales (old males/ewes)</td>
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<tr>
<td></td>
<td>Mohair (M47/goat)</td>
</tr>
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<td></td>
<td>Sales (old goats)</td>
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<tr>
<td><strong>TOTAL</strong></td>
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<th><strong>INTAKES</strong></th>
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<tr>
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<td>Peas</td>
<td>Kg</td>
<td>2.8</td>
<td>12.5</td>
<td>35</td>
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<tr>
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<td>Barley</td>
<td>Bag 80kg</td>
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<tr>
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<td>Medicine cattle</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Ecomycin (bottle 25ml)</td>
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<td>Niclosamide (2x40ml/cattle)</td>
<td>Litre</td>
<td>2</td>
<td>700</td>
<td>1400</td>
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<td></td>
<td>For Enterotoxemia (2x5ml/adult)</td>
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<td>0.26</td>
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<td>156</td>
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<tr>
<td></td>
<td>Niclosamide (2x5ml/sheep)</td>
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<td>Medicine goats</td>
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<td></td>
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<td></td>
<td>Niclosamide (2x5ml/goat)</td>
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<td>700</td>
<td>420</td>
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<td>For Enterotoxemia (2x2ml/adult)</td>
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<td>Barley stalks</td>
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<td>100</td>
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<tr>
<td></td>
<td>Wheat bran</td>
<td>Bag 50 Kg</td>
<td>2</td>
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<td>260</td>
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<tr>
<td></td>
<td>Horse and Poney cubes</td>
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<td>2</td>
<td>170</td>
<td>340</td>
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<td>126</td>
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<td>560</td>
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<td>Sheep pellets</td>
<td>Bag 50 Kg</td>
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<td>150</td>
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<tr>
<td></td>
<td>Wheat bran</td>
<td>Bag 50 Kg</td>
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<td>65</td>
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<td><strong>Supp. Food goats</strong></td>
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<td>280</td>
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<tr>
<td></td>
<td>Sheep pellets</td>
<td>Bag 50 Kg</td>
<td>1</td>
<td>150</td>
<td>150</td>
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<tr>
<td></td>
<td>Wheat bran</td>
<td>Bag 50 Kg</td>
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<tr>
<td><strong>Other</strong></td>
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<td>Pot 250ml</td>
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<td><strong>NAV</strong></td>
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<td><strong>6079</strong></td>
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<th><strong>FIELDS (1.2 Ha)</strong></th>
<th><strong>Area</strong></th>
<th><strong>Livestock</strong></th>
<th><strong>Number</strong></th>
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<tbody>
<tr>
<td>Wheat</td>
<td>0.4</td>
<td>Cattle</td>
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<tr>
<td>Peas</td>
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<td>Sheep</td>
<td>70</td>
</tr>
<tr>
<td>Barley</td>
<td>0.4</td>
<td>Goats</td>
<td>60</td>
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<th>Quantity</th>
<th>Price</th>
<th>Duration of use</th>
<th>Redemption</th>
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<tbody>
<tr>
<td><strong>Crops</strong></td>
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<td>1</td>
<td>1845</td>
<td>50</td>
<td>36,9</td>
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<td>Share of plough</td>
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<td>100</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Harrow</td>
<td>1</td>
<td>1255</td>
<td>50</td>
<td>25,1</td>
</tr>
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<td></td>
<td>Yoke</td>
<td>1</td>
<td>520</td>
<td>15</td>
<td>34,67</td>
</tr>
<tr>
<td></td>
<td>Sickle</td>
<td>2</td>
<td>50</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Handle Hoe</td>
<td>1</td>
<td>32,5</td>
<td>50</td>
<td>0,65</td>
</tr>
<tr>
<td><strong>Livestock</strong></td>
<td>Burdizoo</td>
<td>1</td>
<td>1000</td>
<td>15</td>
<td>66,67</td>
</tr>
<tr>
<td></td>
<td>Motebo</td>
<td>2</td>
<td>500</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Kraal</td>
<td>1</td>
<td>500</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Syringe</td>
<td>1</td>
<td>6</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
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<td>Bucket for milk</td>
<td>1</td>
<td>15</td>
<td>5</td>
<td>3</td>
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<tr>
<td></td>
<td>Ram Merino</td>
<td>1</td>
<td>2500</td>
<td>4</td>
<td>625</td>
</tr>
<tr>
<td></td>
<td>Billy goat</td>
<td>1</td>
<td>1500</td>
<td>4</td>
<td>375</td>
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<td></td>
<td>Bull</td>
<td>1</td>
<td>3000</td>
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<td>375</td>
</tr>
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<td><strong>TOTAL</strong></td>
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<td></td>
<td></td>
<td></td>
<td><strong>16,669,98</strong></td>
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<th>Unit</th>
<th>Qty</th>
<th>Price/Unit</th>
<th>Total</th>
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<td>Salary</td>
<td></td>
<td>2</td>
<td>2500</td>
<td>5000</td>
</tr>
<tr>
<td></td>
<td>Food: maize meal</td>
<td>Bag 80kg</td>
<td>16</td>
<td>250</td>
<td>4000</td>
</tr>
<tr>
<td></td>
<td>Blanket</td>
<td>Unit</td>
<td>1</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>Rubber boots</td>
<td>Pair</td>
<td>2</td>
<td>80</td>
<td>160</td>
</tr>
<tr>
<td></td>
<td>other fees</td>
<td></td>
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<td></td>
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<tr>
<td><strong>MembershipWMGA</strong></td>
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<td><strong>Registration fee</strong></td>
<td>Animal</td>
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<td>620</td>
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<tr>
<td><strong>Shearing</strong></td>
<td>Sheep/ goat</td>
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<td>130</td>
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<td><strong>Fee for shearing</strong></td>
<td>Animal</td>
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<td>130</td>
<td>1</td>
<td>130</td>
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<tr>
<td><strong>M1/kg of wool and mohair (1,1kg/goat - 2,9kg/sheep)</strong></td>
<td>K1/g</td>
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<td>265,4</td>
<td>1</td>
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<tr>
<td><strong>Hired people</strong></td>
<td>Letsema wheat</td>
<td>(1 basin per women)</td>
<td>Basin</td>
<td>20</td>
<td>31,5</td>
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<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>11110,4</strong></td>
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| **NAV**             | 22735,02  |
| **Agricultural Income** | 11624,62 |
| **Income per farmer** | 5812,31  |
## Gross Product

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<th>Quantity</th>
<th>Price/Unit</th>
<th>Total</th>
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<td>Cattle</td>
<td>57</td>
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<td>142500</td>
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<td>Sales cattle butchery Mokhtolong</td>
<td>Cattle</td>
<td>57</td>
<td>8000</td>
<td>456000</td>
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<td>Sales males sheep</td>
<td>Sheep</td>
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<td>900</td>
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<td>Sales old ewes</td>
<td>Ewe</td>
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<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td>1071000</td>
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</tbody>
</table>

## Intakes

### Medicine cattle
- Ecomycin (bottle 25ml)  Bottle: 6 bottles @ 60 = 360 
- Niclosamide (50ml/cattle)  Litre: 19.4 litres @ 700 = 13580 
- Against Enterotoxemia (2x5ml/adult)  Litre: 3.8 litres @ 600 = 2280 

### Medicine sheep
- Ivermectin (M1.3/sheep)  Injection: 1718 injections @ 1.3 = 2236 
- Niclosamide (6ml/sheep)  Litre: 10.3 litres @ 700 = 7210 
- Against Enterotoxemia (2x2ml/adult)  Litre: 3.5 litres @ 600 = 2100 

### Supp. Food cattle
- Minerals (0.5bag/day)  Bag 50 Kg: 182.5 bags @ 60 = 10950 
- Salt  Bag 50 Kg: 50 bags @ 60 = 3000 
- Maize and Barley stalks  Bag 50 Kg: 2 bags @ 130 = 260 
- Wheat bran  Bag 50 Kg: 2 bags @ 60 = 120 

### Supp. Food sheep
- Minerals (1bag/week)  Bag 50 Kg: 52 bags @ 60 = 3120 
- Salt  Bag 50 Kg: 50 bags @ 60 = 3000 
- Barley  Bag 80 Kg: 10 bags @ 280 = 2800 

### Petrol for the car
- (250km/week, 10L/100km)  Litre: 1200 litres @ 11 = 13200 

**TOTAL** 66096

## Redemption

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Price</th>
<th>Duration of use</th>
<th>Redemption</th>
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</thead>
<tbody>
<tr>
<td>Burdizzo</td>
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<td>66,67</td>
</tr>
<tr>
<td>Motebo</td>
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<td>50</td>
<td>20</td>
</tr>
<tr>
<td>Kraal</td>
<td>1</td>
<td>500</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>Syringe</td>
<td>10</td>
<td>6</td>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>Ram mutton Merino</td>
<td>18</td>
<td>850</td>
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<td>Bull</td>
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<tr>
<td>Fridges</td>
<td>5</td>
<td>3000</td>
<td>10</td>
<td>1500</td>
</tr>
<tr>
<td>Meat saw</td>
<td>1</td>
<td>18000</td>
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<td>360</td>
</tr>
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<td><strong>TOTAL</strong></td>
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<td></td>
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<td>13923,33</td>
</tr>
</tbody>
</table>

## Charges

### Herdboy
- Income Herd-boy  Herd-boy: 8 @ 6000 = 48000 
- Food herd-boy (8x1 bag of maize meal per week)  Bag 80kg: 416 bags @ 250 = 104000 
- Blanket for Herd-boys  Unit: 8 @ 200 = 1600 
- Rubber boots Herd-boys  Pair: 8 @ 80 = 640 

### Fees
- Registration fee (M4 per animal)  Fee: 2106 @ 4 = 8424 

### Butchery
- Salaries (M700/person/month)  Salary: 12 @ 1400 = 16800 
- Electricity  Salary: 12 @ 1400 = 16800 
- Taxes  Salary: 12 @ 700 = 7000 

**TOTAL** 266264

## NAV
- 990910,67

## Agricultural Income
- 724646,67

---

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Appendix 15. Wool and mohair quality in Matsoaing (WMGA of Makhapung)

Many different classes of wool and mohair exist, but the main ones, produced in the shearing shed of Makhapung are the following (the proportion of each quality is indicated in brackets):

NB: The data have been given by the LPMS office in Mokhotlong for the WMGA of Makhapung (shearing season 2006-2007 (wool) and 2007 (mohair) for the quality).

- **Wool classes:**
  - Best quality (14 %):
    - the wool of lambs (AH,BH,CH)
    - fine wool of adults (AF)
    - blending of previous qualities
  - Medium qualities (56 %):
    - straight wool with no fleece (A,B,C, A2, B2, C2, with A having a higher length than B, and B than C)
    - A medium
    - length C from the head and belly (CBP)
  - Low qualities (30 %):
    - stained, contaminated with vegetable matter, tangled (BKS, BK2, Lox, Mott)

- **Mohair classes:**
  - Best quality (20 %):
    - the wool of kids, long/short (BKL, BKS)
    - Basotho fine mohair of adults (BFM)
  - Medium qualities (55 %):
    - Basotho medium short/long (BML, BMS), short strong (BSS)
  - Low qualities (25 %):
    - BKL contaminated by seeds (BKLBSDW), stained with mud (BKLBSDT)
    - tangled (Lox)
Appendix 16. Income per sheep and goat sheared

The prices are those of the same period. The prices of the trader are from 2006-2007 (wool) and 2008 (mohair). Because of no data available for the wool and mohair quality at the trader's shed, the same standard of quality, detailed in appendix 15, has been chosen to calculate the average price per goat and sheep as for the WMGA shearing shed. Indeed, the aim of these calculations are not to give exact price but to have an idea of the difference between the two marketing opportunities.

Payment by the government channel:

The initial payment per sheep is the following (based on 2.9kg of wool per sheep):

<table>
<thead>
<tr>
<th>Quality</th>
<th>Percentage</th>
<th>Kg per sheep</th>
<th>Price/kg</th>
<th>Price/sheep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low quality</td>
<td>0,3</td>
<td>0.87</td>
<td>32</td>
<td>27,84</td>
</tr>
<tr>
<td>Medium quality</td>
<td>0.56</td>
<td>1,62</td>
<td>41</td>
<td>66,42</td>
</tr>
<tr>
<td>High quality</td>
<td>0,14</td>
<td>0,39</td>
<td>55</td>
<td>21,45</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>115,71</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The initial payment per goat is the following (based on 1,1kg of mohair per goat):

<table>
<thead>
<tr>
<th>Quality</th>
<th>Percentage</th>
<th>Kg per goat</th>
<th>Price/kg</th>
<th>Price/goat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low quality</td>
<td>0,25</td>
<td>0,27</td>
<td>48</td>
<td>12,96</td>
</tr>
<tr>
<td>Medium quality</td>
<td>0,55</td>
<td>0,61</td>
<td>55</td>
<td>33,55</td>
</tr>
<tr>
<td>High quality</td>
<td>0,2</td>
<td>0,22</td>
<td>60</td>
<td>13,20</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>59,71</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Deductions made before the final payment to the farmer:

<table>
<thead>
<tr>
<th>Deduction</th>
<th>Amount</th>
<th>Total per goat (Maloti)</th>
<th>Total per sheep (Maloti)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Deductions broker</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functioning fee</td>
<td>M0,53/kg</td>
<td>0,58</td>
<td>1,54</td>
</tr>
<tr>
<td>Tariff per bale (counted as 1% per animal)</td>
<td>M41/bale</td>
<td>0,04</td>
<td>0,04</td>
</tr>
<tr>
<td>Commission</td>
<td>3,5% overall payment</td>
<td>2,09</td>
<td>4,06</td>
</tr>
<tr>
<td><strong>Transport</strong></td>
<td>M0,54/kg</td>
<td>0,59</td>
<td>1,57</td>
</tr>
<tr>
<td><strong>Government deductions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance</td>
<td>0,18% overall payment</td>
<td>0,11</td>
<td>0,21</td>
</tr>
<tr>
<td>Levy for scab injections</td>
<td>M0,38/kg</td>
<td>0,42</td>
<td>1,1</td>
</tr>
<tr>
<td>Wool packs</td>
<td>M0,58/kg</td>
<td>0,64</td>
<td>1,68</td>
</tr>
<tr>
<td>Value Added Tax</td>
<td>14% overall payment</td>
<td>8,35</td>
<td>16,23</td>
</tr>
<tr>
<td><strong>Total deductions</strong></td>
<td><strong>12,82</strong></td>
<td><strong>26,43</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Payment to farmers</strong></td>
<td><strong>46,85</strong></td>
<td><strong>89,53</strong></td>
<td></td>
</tr>
</tbody>
</table>

Except for transport, all the deductions are done by the BKB and transferred to the Lesotho government (national levies or taxes). About 22 % of the overall payment is deducted.
Payment by the trader:
The initial payment per sheep is indicated in the table (based on 2,9kg of wool per sheep):

<table>
<thead>
<tr>
<th>Quality</th>
<th>Percentage</th>
<th>Kg per sheep</th>
<th>Price/kg</th>
<th>Price/sheep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low quality</td>
<td>0,38</td>
<td>1,1</td>
<td>6</td>
<td>6,60</td>
</tr>
<tr>
<td>Medium quality</td>
<td>0,55</td>
<td>1,6</td>
<td>13</td>
<td>20,80</td>
</tr>
<tr>
<td>High quality</td>
<td>0,07</td>
<td>0,2</td>
<td>15</td>
<td>3,00</td>
</tr>
</tbody>
</table>

TOTAL 30,40

The initial payment per goat is the following (based on 1,1kg of mohair per goat):

<table>
<thead>
<tr>
<th>Quality</th>
<th>Percentage</th>
<th>Kg per goat</th>
<th>Price/kg</th>
<th>Price/goat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low quality</td>
<td>0,25</td>
<td>0,28</td>
<td>5</td>
<td>1,40</td>
</tr>
<tr>
<td>Medium quality</td>
<td>0,57</td>
<td>0,63</td>
<td>16</td>
<td>10,08</td>
</tr>
<tr>
<td>High quality</td>
<td>0,18</td>
<td>0,2</td>
<td>31</td>
<td>6,20</td>
</tr>
</tbody>
</table>

TOTAL 17,68

The trader also has to deduce a levy of M0,38 per sheep/goat for the national vaccination campaign against scab, which is transferred to the government.

The final income per sheep and goat is:

<table>
<thead>
<tr>
<th>Deduction</th>
<th>Amount</th>
<th>Total per goat (Maloti)</th>
<th>Total per sheep (Maloti)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levy for scab injections</td>
<td>M0,38/kg</td>
<td>0,42</td>
<td>1,1</td>
</tr>
<tr>
<td>Payment to farmers</td>
<td>17,26</td>
<td>29,3</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 17. Cropping calendar and income generated by a vegetable garden

Cropping calendar for a vegetable garden:

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price/Unit(Maloti)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rape + Mustard</td>
<td>Bunch</td>
<td>20</td>
<td>4</td>
<td>80</td>
</tr>
<tr>
<td>Onion</td>
<td>Unit</td>
<td>30</td>
<td>1.5</td>
<td>45</td>
</tr>
<tr>
<td>Carrot</td>
<td>Bunch</td>
<td>20</td>
<td>2.5</td>
<td>50</td>
</tr>
<tr>
<td>Tomatoe</td>
<td>Unit</td>
<td>30</td>
<td>1.5</td>
<td>45</td>
</tr>
<tr>
<td>Beet root + spinach</td>
<td>Bunch</td>
<td>30</td>
<td>4</td>
<td>120</td>
</tr>
<tr>
<td>Potatoes</td>
<td>Kg</td>
<td>10</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>Cabbage</td>
<td>Unit</td>
<td>40</td>
<td>4.5</td>
<td>180</td>
</tr>
<tr>
<td>Peaches</td>
<td>Tin</td>
<td>3</td>
<td>50</td>
<td>150</td>
</tr>
</tbody>
</table>

**GROSS PRODUCT**

| Total            | 700 |

| Vegetable seeds  | Spoon | 8    | 2.5  | 20   |

**INTAKES**

| Total            | 30   |

Gross Added Value/25m² 670
Appendix 18. The poultry production

The calculations are based on a 16-month period, are based on a feeding with grains of maize, but it could be done on the basis of a wheat diet. The length of the period has been chosen according to the calendar of births and dates of sales.

Calendar of births and sales, for poultry production, based on a 16-month period

The data and parameters have been obtained through interviews with farmers in the lowlands, who have implemented poultry production for several years.

Hens can lay eggs after 22 weeks (5.5 months)
3 eggs are produced per hen per week
It is assumed that a hen gives new chicken 3 months after the previous litter (4 chicken per litter)
Each litter is composed of 50% of males, 50% of females
"Grower", meal for chicken<3months (3.35kg/chicken)
Grains of maize for chicken>3months (0.3kg/week)
The chicken, when not kept, are sold after 3 months M25 each
Appendix 19. Article about family farming

Why shall the Maluti farmers be supported in order to improve their livelihood?

Maluti farmers belong to the 1 billion farmers who feed the world. In Lesotho 6 persons on 10 make a living with agriculture. Farmers are the roots of the society and the society is like a tree. Without roots a tree cannot grow so is the contribution of the farmers to their country.

However there is a growing disparity in the livelihood between the mountain people and the ones living in the Lowlands. Numerous farmers are reliant on migrant labour and are compelled to subsistence farming. But what can a Maluti farmer do when only half of the households of the Sehonghong valley own a plough? Or else when there is no other source of income than wool and mohair production?

Because Maluti farmers must be proud of their work, and because they should be supported in their efforts to improve their livelihood, the following paper provides some issues anyone should be aware of.

1. What kind of farmers are Maluti farmers compare to the wide range of world's farmers.
2. How Maluti farmers contribute to Lesotho's wealth and development
   a) Create employment while there is few in the country
   b) fight against social injustice and poverty
   c) feed the Basuthos and more countries
   d) Contribute to preserve the beautiful Maluti mountains

1. What kind of farmers are Maluti farmers compare to the wide range of world's farmers.

The Maluti farmers are small scale farmers or family farmers. There are many differences among them which come from the history of their family, their agricultural practices, the characteristics of their land and their means.

Example: If the parents give their children fields, the children's living is quite different that the landless. Or for those living up in Matsoaing it is not possible to grow maize but only wheat.

Despite all the differences among the Maluti farmers, all of them have something in common:

Maluti farmers do not produce to sell but to live

It means that the feeding of the family is the most important thing. But also the transmission of the know-how and the field(s) to the children is capital. It can be added that all the family members participate to the activities: help with the animals and in the fields.

What Maluti farmers are not:

In Lesotho and all over the world are some other kinds of farmers, among them are the so called “capitalists”. They are very different as they do not live on the farm, nor work in the fields, but hire people to manage the farm and they only want to make profit. Earning money is their only aim, it is not sustainable.

Example: in Natal the sugar cane plantations' owners hire people to work hard in the field. The salary are very low compared to the money that is made. In addition to this, as there is no rotation
but only sugar cane, the soil will soon be exhausted. The bosses do not give a damn because they have become rich, so they can leave for another business and fire their workers. Is it fair and sustainable?

Family farmers could be more supported. The reason is that it seems that the capitalists can provide more money for the country. But Maluti farmers can as well make profit and participate to the welfare of all the Basotho.

2. How Maluti family farmers contribute to Lesotho's wealth and development

a) When Mokhotlong and Maseru have no work, Maluti farmers create employment:
- Because all the members of the family work on the farm and even people are employed to plough or to cultivate the fields, thus it creates employment and provide for the living of the poorer.
- On the contrary a vast capitalist farm of maize in the Lowlands only requires one hired man driving a tractor to produce as much as several Maluti farmers. It might look nice that the tractor helps increasing the harvest. But what happens then to all the people who make a living by working in the field of others?

So farmers of the Maluti employ people and in that way contribute to the government aim of full employment. And better than this, it can prevent the departure of the youth and the poorer towards the city where there is no jobs but mostly misery.

b) Maluti farmers can fight against social injustice and poverty:
- In the mountain areas all the members of the family work on the farm. The harvest is shared among all the family and the money is used to provide the whole family with goods.
- On the contrary a capitalist farmer aims at making money. So his employees only get a small part of the profit while the boss gets richer.

Lots of people think that capitalist agriculture provides more money than family farming. In fact it is often due a better access to land, high yield varieties, fertilisers and bank credits. But if Maluti farmers could get such advantages they could create more wealth. Why? Because in their fields there are both maize and beans, so when the capitalist only grow one crop, the family farmers get 2 harvests.

- Family farmers earn less money than capitalists. This is mainly due to the difficulty of producing surplus and then to manage to sell them. But the poorer people are the landless.
- However farmers have always found by themselves the solutions to solve their problems. For example: to increase the income some create new activities such as growing peaches, collecting fire-wood, brewing beer, grow vegetables and so forth.

That is why farmers must be helped to produce more in terms of yield and per quantity of labour. But as well to find a market to sell their products and so increase their income.

c) Till present time farmers have always managed to feed themselves and the whole
population. If no one helps them who will feed the world?

-When farmers can produce surplus they sell it to urban people, and thus get money to buy manufactured goods while urban have food to eat. For example: cabbages, tomatoes, onions, animals sold in Mokhotlong.

-Lesotho is dependent on food imports as the food production is low. Would not it be wise to help farmers so that they could produce more, and help reducing the country's dependence?

-Today the wool and mohair growers can provide numerous countries overseas with their products. This has been fulfilled with the help of the government. Let it be the same with food production.

d) Family farming often preserves the natural resources as it is their means of subsistence

-In the Sehonghong valley the preservation of the natural resources is of high priority, particularly land erosion. Otherwise no more crop will grow and there will be nothing to transmit to the children but a sterile land. One big issue is land erosion, the elders found how to prevent the soil from erosion: they practised contour ploughing, maintained grass strips and built furrows. But nowadays some have forgotten to pursue the work of their parents. What shall we do?

-Pastures degradation is of high importance as it affects the wool production in terms of quantity and quality. The elders already observed this and with the help of the government or of association implemented summer and winter pastures. But the number of animals has increased and it might not be enough. What is the present generation's contribution to protect its source of living?

From the past time till present farmers have proven their adaptability. People know how to adapt themselves and the way it shall be, let them be encouraged and helped in the enforcement of their ideas.

As people are grouped in families and in villages because they know that only together they can achieve their living, let us continue in this way and think together about the common future.

SUCCESS DEPENDS ON YOUR WILLINGNESS TO FACE TOGETHER YOUR CONSTRAINTS AND TO WORK TOGETHER

Example: Look at the success of the groups of interest encouraged and advised by the agricultural advisor ‘Me Malineo. The members of the group managed to improve the livelihood of their family with the new activities they have enforced. Among the reasons of their success we can say that they group together and help each other by exchanging advices and ideas.

So today the Lesotho association PELUM, With Lehasa, Pulane le Pule Nyaphisi suggests that we start thinking together to the improvement of the livelihood of all.

PELUM can be your partner in the enforcement of your capacity building. And can also help you to identify your difficulties and think about how to solve them. If your common projects require help from outside, PELUM will be your voice at the government level and whoever can provide you help to strengthen the implementation of your projects.

“The hasty one eats a goat, while the steady and thorough one eats a cow”
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<table>
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<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACP</td>
<td>African-Caribbean-Pacific countries</td>
</tr>
<tr>
<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
</tr>
<tr>
<td>BLNS</td>
<td>Botswana Lesotho Namibia Swaziland</td>
</tr>
<tr>
<td>BKB</td>
<td>Boermakelaars Koop BKP</td>
</tr>
<tr>
<td>CBO</td>
<td>Community Based Organization</td>
</tr>
<tr>
<td>CSO</td>
<td>Civil Society Organization</td>
</tr>
<tr>
<td>ESAFF</td>
<td>Eastern and Southern Africa Small Scale Farmers’ Forum</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GRET</td>
<td>Group of Research and Exchange of Technology</td>
</tr>
<tr>
<td>ha</td>
<td>Hectare</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>IEPA</td>
<td>Interim Economic Partnership Agreement</td>
</tr>
<tr>
<td>ISAS</td>
<td>Institute of Southern African Studies</td>
</tr>
<tr>
<td>kg</td>
<td>Kilogramme</td>
</tr>
<tr>
<td>LANFE</td>
<td>Lesotho Association of Non-Formal Education</td>
</tr>
<tr>
<td>LPMS</td>
<td>Livestock Produce Marketing Services</td>
</tr>
<tr>
<td>M</td>
<td>Maloti</td>
</tr>
<tr>
<td>m</td>
<td>Metre</td>
</tr>
<tr>
<td>m.a.s.l</td>
<td>Metres above sea level</td>
</tr>
<tr>
<td>MG</td>
<td>Marketing group</td>
</tr>
<tr>
<td>NGO</td>
<td>Non Governmental Organization</td>
</tr>
<tr>
<td>NUL</td>
<td>National University of Lesotho</td>
</tr>
<tr>
<td>PELUM</td>
<td>Participatory Ecologically Land Use Management</td>
</tr>
<tr>
<td>PSC</td>
<td>Produce Sub-Committee</td>
</tr>
<tr>
<td>RSA</td>
<td>Republic of South Africa</td>
</tr>
<tr>
<td>SACU</td>
<td>Southern African Custom Union</td>
</tr>
<tr>
<td>SADC</td>
<td>Southern African Development Community</td>
</tr>
<tr>
<td>SAMB</td>
<td>South African Mohair Board</td>
</tr>
<tr>
<td>SAP</td>
<td>Structure Adjustment Plan</td>
</tr>
<tr>
<td>SAWB</td>
<td>South African Wool Board</td>
</tr>
<tr>
<td>TDCA</td>
<td>Trade Development Corporation Agreement</td>
</tr>
<tr>
<td>VAT</td>
<td>Value Added Tax</td>
</tr>
<tr>
<td>WGA</td>
<td>Progressive farmers</td>
</tr>
<tr>
<td>WMGA</td>
<td>Wool and Mohair Growers Association</td>
</tr>
<tr>
<td>WMPA</td>
<td>World Mountain People Association</td>
</tr>
</tbody>
</table>

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ABSTRACT

Lesotho in a mountain kingdom, surrounded by the Republic of South Africa. In the remote Sehonghong valley, at 2000 m.a.s.l in the Highlands, livestock production is central to the economy of the mountain farmers. Multi-purpose cattle provide the farmers with the essential draught power, whereas wool sheep and mohair goats' fleece is the only source of income since the settlement in the mountains. However, due to the rise in the costs of production, livestock production has become the privilege of few. Particularly, the deterioration of the communal grazing lands has led the supplemental feeding of the animals to be crucial. Moreover, due the shortage of arable land, the present generation is compelled to find off-farm activities and to rely on migrant labour remittances to survive. But both of these sources of income have proven to be quite uncertain. Furthermore, since the country is involved in a common customs area with the surrounding powerful Republic of South Africa, the development of a wealthy agriculture and of a profitable industry is undermined. In this context, the sale on the local market of high added value crops that require little space is an opportunity for the mountain farmers.

Key-words
Lesotho, agrarian diagnosis, mountain farming, Merinos sheep, Angora goats, communal pastures, wool and mohair commodity chain

RÉSUMÉ

Le Lesotho est un royaume montagneux grand comme la Belgique entouré par l'Afrique du Sud. Dans la haute vallée de Sehonghong située à plus de 2000 mètres d'altitude et couvrant 2/3 de la surface du pays, la population pratique une agriculture de subsistance et l'élevage de ruminants. Les bovins fournissent la force de traction nécessaire au travaux des champs alors que la vente de la toison des moutons Merinos et des chèvres Angoras est l'unique source de revenu. Toutefois l'élevage est devenu le privilège d'un faible nombres d'agriculteurs en raison de l'augmentation des coûts de productions. En particulier, il est devenu nécessaire de compléter les animaux en raison de la dégradation des pâturages communaux sur lesquels repose l'alimentation des troupeaux. Par ailleurs, des suites de la croissance de la population, la génération actuelle ne dispose plus de suffisamment de terres à cultiver. Pour cette raison, la survie de nombre de familles dépend d'activités extra-agricoles ou du revenus de travailleurs migrants. Par ailleurs, l'intégration du pays dans une union douanière avec sa puissante voisine l'Afrique du Sud favorise l'importation de denrées étrangères au détriment du développement du secteur agricole et industriel. Dans ce contexte, la mise en place de cultures peu demandeuses d'espace et à haute valeurs ajoutées, commercialisables localement, offre une opportunité aux agriculteurs de la vallée.

Mots-clés
Lesotho, diagnostic agraire, agriculture de montagne, moutons Mérinos, chèvres Angoras, pâturages communaux, filière laine et mohair