

The mixed production systems and livestock practices in the Boji district (Western Wellega Zone) of Ethiopia

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Abstract

This article describes the production system in the rural district of Boji in Western Wellega in Ethiopia. Data was gathered from surveys, which are part of a research project on Contagious Bovine Pleuropneumonia (CBPP). The observed system very closely combined an essentially cereal-based agriculture and livestock farming. The farm characteristics, cultivation and livestock sub-systems as well as livestock practices were examined in detail. The farms were of small size and were characterised by a subsistence economy. The cultivation practices in Boji were similar to other equivalent agro-ecological zones in the Ethiopian highlands. The main objective of livestock farming was the use of oxen for draught power. The greatest strain on the system was linked to demographic pressure. The special feature of the livestock practices was the widespread use of animal exchanges between farmers, a possible risk factor in the spread of (CBPP) in this region.

Keywords

Mixed crop-livestock farming systems; Livestock practices; Boji district; Ethiopia.

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1. Introduction

With a population of 30 million cattle and 40 million small ruminants, Ethiopia is the country on the African continent with the greatest livestock population (ILRI, 2000). The agricultural sector employs 80 to 85% of the population estimated at 65 million in Ethiopia and contributes more than 40% to the total GDP (CSA, 2001). This rural population is mostly composed of small farmers living in the highland area, located above 1500 metres, combining agriculture and livestock farming. Seventy percent of the human and animal population of Ethiopia are located in this area (Gryseels and Anderson, 1983). Together with the seasonal shortage of nutrient supply, both in quality and quantity, animal diseases are a major strain on productivity of the Ethiopian livestock sector (Sileshi et al., 2001). Among these, Contagious Bovine Pleuropneumonia (CBPP), has been spreading alarmingly since the beginning of the 90s in Ethiopia, where it presents a major threat to livestock farming (Masiga et al., 1996). CBPP is a contagious respiratory disease, specific to cattle, caused by *Mycoplasma mycoides subsp. Mycoides SC* and characterised by pneumonia and serofibrinous pleuresy (Provost et al., 1987). The Office International des Epizooties (OIE, 1994) underlined the urgency of evaluating the economic losses caused by CBPP in Africa and to carry out a cost-benefit analysis of control strategies. A study intending to assess the epidemiological parameters of the spread of CBPP in the field was set up in one Ethiopian region, the district of Boji in Western Wellega. A preliminary description of the livestock farming system in this study zone, following the approach adopted by ILRI livestock research (Rey and Fitzhugh, 1994), is the subject of this article. The district of Boji was chosen for its location in a zone of emerging CBPP on the highlands. With widely varying geographical and climatic conditions, Ethiopia is a country in the Horn of Africa where the diversity of production systems is particularly significant (Faye, 1994). Examples of system studies in Ethiopia are many. These studies concern systems in the highlands as in the regions of Debre Berhan (Gryseels, 1988; Gryseels and Anderson, 1983), Gurage (Deheuvels and Derrey, 1998), Bako (Dadi et al., 1992) or Arsi (Yirga et al., 1992) but equally systems in transition

zones as in the region of Nazareth (Mulatu et al., 1992) and in the lowlands as in Borana (Cossins and Upton, 1987).

This article describes the geographical and climatic characteristics of the study zone, its agricultural production system and presents a detailed analysis of its livestock farming system through its livestock practices.

2. Methods

A cross-sectional survey on livestock practices was conducted from May to August 2000 in the district of Boji (Fig. 1). A total of 108 cattle-keeping farms, selected in a non-stratified random sample, were visited. They were representative of the district of Boji; eighty-six were situated in the highlands and twenty-two in the lowlands.

Another cross-sectional survey, a census on herd size and composition, was carried out between May and July 2001 in a subdivision of the district of Boji, in the Peasant Association (PA) of Burqa Boji, close to Bila in the highlands. All the farmers from the PA, numbering 488, were questioned (Descamps, 2001).

A longitudinal survey of tagged animals (i.e. herd monitoring) from 70 herds was conducted for one year, between December 2000 and November 2001, in the district of Boji, for the needs of the CBPP study. This monitoring had demographic and health components. Six interviewers visited every two weeks and recorded the arrival and departure of animals as well as the symptoms of sick animals and the veterinary care applied. The selected livestock farms were only representatives of one part of the district, namely the highlands. They are of significant size to allow for the study of the spread of CBPP and have few animals on loan from other farmers.

Using the results of this monitoring, Lesnoff et al. (2002) calculated the demographic parameters of cattle livestock in the district of Boji.

Another source of information for this article was the Ethiopian statistics published by the CSA (Central Statistical Authority). Results of cross-sectional investigations at national, regional, zonal or district level are available.

3. Geographic and climatic characteristics of the Boji district

The district of Boji is situated in the west of Ethiopia in the Administrative Zone of Western Wellega (Fig. 1) in the Oromo Region. Its surface area is 966.1 km², which represents 4% of the Western Wellega Zone. The main town Bila is situated approximately in the centre of the district at latitude of 9.36° North and a longitude of 35.59° degrees East.

Western Wellega has a population of 1.9 million and the district of Boji holds a population of 100,300 (CSA, 2001). Boji has a population density of 103.8 inhabitants per km² and is located at an altitude varying from 1200 to 2100 meters. The most part is therefore situated in the agro-ecological zone of Woina Dega (Getahun, 1978), a zone of moderate altitude, between 1500 and 2300 metres characterised by a relatively high rainfall level. A smaller part of the district in the North East is located in the lowland zone, named Kolla, situated below 1500 meters. The landscape of the Woina Dega zone is hedged farmland; rolling hills separated by streams or rivers bordered by gallery forests. The hills are covered by cultivated fields or pastures, often separated by eucalyptus hedges and groves of rush and acacia. In the lowlands, pastures are more common and the natural vegetation consists mainly of bamboo.

The rains follow a monomodal cycle with a rain season from May to October rising to a peak in July and a dry season for the rest of the year; the rains can start in March or April and last until November. The rainfall in Western Wellega fluctuates from district to district and year to year, between 1300 and 2000 mm per year (Western Wellega Zonal Agricultural Office, 2002, personal communication); there is no statistics concerning the district of Boji.

4. The production system

The production system observed in the district of Boji was a mixed intensive system combining closely a mainly cereal-based agriculture and livestock farming. It is a fully integrated system as the crop-livestock interaction is complete (McIntire and Gryseels, 1987). It is the most common sedentary system in the Ethiopian highlands, between 1500 and 3000 metres (Faye, 1994). The district of Boji has agro-ecological characteristics suitable for the

production of coffee and fruit. Unlike other systems in the highlands, such as the false banana (Ensete) system in the Gurage region (Deheuvels and Derrey, 1998), pasture zones were relatively numerous in Boji and intensive cattle farming played a major role in the production system. Incidentally, Wellega exports some much appreciated butter to urban markets such as Addis Ababa (Duteurtre, 1998). However not all farmers kept cattle. According to the census carried out in the PA of Burqa Boji, only half the farmers kept cattle (Descamps, 2001). Households without cattle might own animals that were looked after by a neighbouring farmer or might temporarily borrow cattle from other farmers.

The rearing of small ruminants was not well developed, unlike in the central and northern highlands of Ethiopia (Gryseels and Anderson, 1983).

As in other zones in the Ethiopian highlands (Mohamed-Saleem and Mwendera, 1996), the main pressure on the system is the increasing population. To meet their dietary needs, farmers have to reduce the pastoral zones and over utilise the cultivable land. They minimise the fallow areas and resort to chemical fertilisers to compensate for the loss in fertility. Soil degradation, although not as advanced as in the highlands in the centre and the north of Ethiopia (Hagos et al., 1999) is a major threat to the continuation of the system. However, the farmers in the district of Boji were able to exploit the nearby lowlands for pasture and cultivation. Other pressures on the system are animal and crop diseases (pests, termites), the lack of infrastructure (roads, medical and veterinary centres, professional training centres) and the low market demand for agricultural production. The sale of produce at extremely low prices in year 2001 made it difficult for the farmers to purchase chemical fertilisers and other agricultural inputs. Scientific knowledge on soil characteristics is insufficient in Boji. Scientific support, practically non-existent at present, would make it possible to optimise culture (teff in particular) and soil management (Boji Woreda Agricultural Office, 2002, personal communication).

5. The farm

The farmer's first objective in the district of Boji is to meet the food requirements of the household throughout the year (Laval, 2000). It is a subsistence economy as in other systems found on the Ethiopian highlands (Gryseels and Anderson, 1983; Dadi et al., 1992; Yirga et al., 1992).

5.1. *The work*

The labour force necessary for the work of the farm was provided by household members whose average number were 5.5 in Western Wellega (CAS, 2000b, Table 1). The yearly availability of the labour force was superior to the total needs of the farm. Nevertheless the seasonal fluctuation of the work, centred around the cultivation schedule (Table 2) sometimes required employing people from outside the household, as was also observed by Gryseels and Anderson (1983) around Debre Berhan.

The intensive work period was during the harvest from October to January. The supervision of animals was often delegated to an employee. The various tasks were shared out according to the gender and age of the different members of the household.

5.2. *The land*

Farms were small. The distribution of farms according to their surface area in Western Wellega is as follows (CSA, 2000b): 24.0% below 0.5 ha, 26.3% between 0.5 and 1 ha, 32.5% between 1 and 2 ha and 17.1% above 2 ha. The average size is close to the national average of 1.0 ha (Table 1). Only 9% of the cultivable land is set aside (CSA, 2000b) and this proportion is decreasing. As in other systems in the highlands, the average surface area of farms has dramatically decreased during the last decades because of demographic pressures. Around Bako, the cultivated surface area per household was 1.6 ha in 1986 and 2.6 ha in 1977 (Dadi et al., 1992).

5.3. *The capital*

The main form of capital was cattle. Other forms of capital were farm equipment, in particular the traditional plough, and the eucalyptus hedges. The main sources of cash were the sale of cereals (maize, sorghum and teff), coffee and butter.

5.4. *Production factors*

The farmers were dependent on chemical fertilisers, mostly used for growing maize and teff, and on maize seeds. For livestock, the main inputs were animal feed and veterinary care. Secondary productions derived from livestock (manure and traction) were production factors for the cultivation sub-system (Laval, 2000) and were sometimes exchanged for grain by farmers without or with few cattle.

6. **The cultivation sub-system**

6.1. *The types of crops*

The main crops were cereals, cultivated on hillside fields. In order of importance of cultivated areas and production, maize, sorghum, millet, teff (*Eragrostis abyssinica*) and, more rarely, wheat and barley are grown (CSA, 2000a, see Table 3).

In the lower damp gullies, or “bonné”, there were crops of maize and vegetables (cabbage, onion) during the dry season. Alongside cereal crops, farmers grew vegetables, legumes and tubers such as Chilli pepper, beans, peas, sweet potatoes, potatoes and yam in plots close to dwellings.

A commonly grown oleaginous plant was nug (*Guizotia abyssinica*).

Perennial plants occupy 20 % of the farmed areas in Western Wellega (CSA, 2000b).

Fruit trees were planted around the huts (bananas, avocados, papayas, and mangoes). The growing of coffee was frequent in the zone of Woina Dega. It was carried out under the cover of trees, often from wild seedlings. The profitable growing of chat (*Cath edulis*), a plant known for its stimulating properties existed but remained rare.

6.2. The cultivation schedule

The farmers divided the year into four distinct growing seasons (Bona, Arfasaa, Gana and Birra in Orominya language), with each season corresponding to specific climatic characteristics (Table 2). The main tasks were preparation of the fields before sowing, hand weeding, a particularly arduous task for maize, and harvesting. The cultivation schedule was similar to that of the Bako region (Dadi et al., 1992) where the main crops are maize and teff.

7. The livestock sub-system

Three “poles” with multiple interactions characterise the livestock system: man, animal and resources (Landais, 1992).

7.1 Man

The farmers in the district of Boji were predominantly of the Oromo ethnic group, of the Cushitic branch linguistic group and of Christian religion. They were sedentary and lived with their family, of variable size, in an isolated farm or in a hamlet. A few Gumuz, of the Nilotic ethnic group lived in the lowlands (Kolla) and had recently started livestock activities.

7.2 Animal

The animal pole was characterised by the predominance of cattle. A few sheep and goats could be bred for meat and leather and a few equines (donkeys, mules and horses) as pack animals. There were also some poultry. The cattle were by far the most important domestic animals, both numerically and economically, and were at the base of the organisation of the production system. There were 1.28 million heads of cattle in Western Wellega in year 2001 (Western Wellega Zonal Agricultural Office, 2002, personal communication). According to the estimates of the Boji Woreda Agricultural Office (2002, personal communication), there

were 55 700 cattle, 8 000 small ruminants (two-thirds ovine and one-third caprine), 3 500 equines (predominantly donkeys) and 20 000 poultry in Boji in year 2001.

The cattle from Western Wellega are principally of the Horro breed, an intermediate Sanga-zebu type (Alberro and Haile-Mariam, 1982), also called "Zenga"; they are of average size, with a uniformly reddish brown coat but can also be cream, black, tawny or red and white. The other breed, in lesser numbers but frequently seen in the south of Western Wellega, is the Abigar: it is from Sanga group and native to the neighbouring pastoral region of Gambella. It was not seen in the district of Boji.

7.3. Resources

Pastures were the main food supply of the livestock system but agricultural products or by-products could also be found. Water was plentiful: the water points, streams mainly, were permanent and situated at a short distance (less than half a kilometre) from most dwellings. The other resources were financial and material (i.e. capital) with multiple uses. One can also add non-material resources linked to the socio-cultural environment: the norms and references which allow the livestock farmer to make decisions and which have their origin in the organisation of the village community (traditions, various rules).

8. Livestock Practices

8.1. Grouping practices: the constitution of the herds

In the district of Boji, a cattle herd can be defined as the whole of the animals which are regularly gathered together at night in the same enclosure under the responsibility of the same household, whose management during the day can vary according to the type of function required of the animals (oxen, cows, calves....) and the season to meet the objectives of the production system. Mature animals and the young, which had been weaned, were gathered together during the night in a temporary enclosure in the open air, the della, built on a plot of land close to the farm. This enclosure was moved regularly, every 3 to 5 days, to allow the

recycling of fertility on the cultivated plots. The young, which had not been weaned, were separated from the main herd and remained in a shelter at night, often in the farm. They had no contact with the mature animals except during milking, in the morning and at night. The herds varied in size, from a few animals to about forty, with an average size of 10.5 cattle per della, according to the census carried out in the PA of Burqa Boji (Descamps, 2001); the calculation of this average excluded farmers who do not own a della. This figure was superior to that of other systems in the Ethiopian highlands. It was 6.3 around Bako in 1986, including 15% of farmers without animals (therefore a raised average of 7.4 heads of cattle for those owning animals) (Dadi et al., 1992) and 5.0 around Debre Behran in 1980 (Gryseels and Anderson, 1983). For the large herds of more than 15 to 20 heads, several farmers could share the ownership of different animals but the management was carried out jointly. The structure of the herd showed a greater number of females (61%) and a rapid decrease in numbers after the age of 9 years (Lesnoff et al., 2002).

8.2. Management practices

During the day, the animals of the della grazed, with a keeper, on common or private pastures or, at the end of the Bona and during the Arfasaa seasons, on crop residues after the harvest. In the lowlands (Kolla) only, animals could graze freely without keeper. Several herds could mix on common pastures; a single keeper could then undertake the surveillance of all the animals. This mixing of the herds on the pastures was a risk factor for the spread of contagious diseases such as CBPP. The young animals, not yet weaned, could be brought separately to the pastures or remain tied up in the farm. Other foodstuffs, originating from agricultural products, could supplement the animals' rations: residues from the cereal harvest and, for working animals only (oxen during farm work and lactating cows), concentrates in the form of grain (maize, sorghum), salt or other residues such as from the making of tella and arake (local alcoholic drinks). Bulls were castrated at the age of 4 or 5 years to then be trained for traction work. Docile bulls of good physical constitution could be left whole (i.e. non-castrated) longer, to be used for reproduction. A reproductive male, chosen for his

qualities, was often brought to cover a female on heat to a neighbouring herd. It could then spend several nights in the female's dilla. This also presents a transmission risk factor for contagious diseases between herds. According to the data from the monitoring of 70 herds in year 2001, births occurred mainly at the beginning of the dry season, between November and February and the average age of the first calving was between 5 and 6 years (Lesnoff et al., 2002). The reproduction period occurred between February and May, i.e. after the period of intensive farm work (harvesting and threshing). The reproduction period in the district of Boji was linked to the work schedule of the animals. The favourable period was when the animals, not involved in work, were available for reproduction.

The pathologies most commonly found in the district of Boji were CBPP (Contagious Bovine Pleuropneumonia) and other respiratory diseases, trypanosomiasis, anthrax, blackleg and internal parasites.

Livestock farmers made use of public and private veterinary services for the treatment of sick animals but could also use an informal market for the purchase of medicine (notably injectable antibiotics). For respiratory diseases (including CBPP) the use of oxytetracycline injected by the farmers themselves was very frequent. Vaccination campaigns were organised by the public services but this remained infrequent. Finally, for certain pathologies such as anthrax a traditional veterinary medicine based on plants was still in use.

8.3. Exchange practices

The scale of animal exchange practices through loans between farmers was one special feature of the livestock system in our study zone. Loans were the most frequent cause of departure of an animal from the herd, well ahead of sales and slaughter but also the most frequent reason for entry into the herd, ahead of purchase (Table 4). Within the 70 herds monitored in the district of Boji, more than 30% of the animals above the age of one year were removed during the year, for loans (Lesnoff et al., 2002). These exchanges became effective through loan contracts. They are commitments of varying length between two farmers wishing to share animal resources (draught power and manuring mainly) and

vegetable resources (pasture, cultivation), to the benefit of each contracting party (Table 5). During a loan, the entrusted animals enter the herd of the recipient farmer who then takes over its management. Three types of contract could be singled out (Table 5): fattening contracts against manuring (*dereba*), ploughing contracts (*goubo*) and supervision contracts. They included all categories of animals although *derebas* included mostly the young non-productive groups (between 1 and 5 years) and *goubos* only the males used for traction. The frequency of departures on loans varied with the types of contract and the seasons (Table 6). For instance departures in *goubo* were more frequent during *Arfasaa* and *Gana* because it was the ploughing season. Certain types of farmers tended to lend many animals, especially in *dereba*. This was the case for farmers with large numbers of animals (more than 10) who did not have enough pasture close by to feed their herd. It was this type of farmers who were mostly represented in our sample study (table 4). Others, on the other hand, tended to receive animals. This was the case for farmers with small numbers or for farmers with no animals who needed draught power for ploughing and borrowed one or two oxen in *goubo* during the year. The contracts of the *dereba* type were frequent with the farmers from the highlands (*Woina Dega*), who were the lenders, towards those from the lowlands (*Kolla*), the recipients. They took place during the dry season (*Bona*) when the pastures in the highlands, zones of greater density, were not sufficient, whereas they were still plentiful in the pastoral zones of the lowlands. The exchange practices present a major risk factor for the spread of CBPP between the herds in the district of Boji.

8.4. Renewal practices

Renewal practices are operations which modify the composition of the herd (Landais, 1992), except in the case of exchanges, because these are temporary. Therefore they include purchases, sales, slaughter and gifts. Sales were of the order of one animal per herd per year (Table 4). Purchases were not so frequent. Slaughter on the farm was very rare and no gift was recorded during our longitudinal investigation. The main cattle market in the district of Boji took place in Bila twice a week. There were two other secondary markets in the district.

Animal commercial exchanges could also take place directly on the farm. All types of animals were concerned but draught power oxen represented the greatest number of commercial transactions; they also had the greatest value. The main reason for sales was the need for cash for the household, more infrequently for the culling of aged animals. Purchases for a farmer (butchers and merchants could also buy animals) were motivated by the need to stock a herd or capitalise on cattle; this, therefore, rather involved the wealthy farmers with a large herd.

8.5. Practices for the exploitation of animals: animal productions

As in most mixed systems seen on the Ethiopian highlands (Astatke and Mohamed-Saleem, 1996), the first objective of cattle rearing in the district of Boji was the production of animal labour, yoke traction particularly. The males, most often castrated and always in pairs, pulled a plough, named locally a “maresha” (Goe, 1987), for the ploughing of plots intended for cultivation, following a well defined schedule (Table2). The most intensive period of traction work was during Gana. There were two other types of animal work: the trampling of the fields to break up the clods of earth, an indispensable operation for the growing of teff and millet, and the threshing of the same cereals to separate the grain from its hull. Threshing was a very physical activity that took place principally in January and February. All types of animals could do these two operations and, in particular, the young ones; equines could also be involved in threshing. The other important animal productions were milk and manure. Milking was done manually in the morning and evening from the lactating cows; the calf was removed at night and during the day from its mother and allowed to suckle before milking, to stimulate the coming of the milk, and after milking, if there was still some available. The manure, used as fertiliser, allows the recycling of organic matters. It was scattered on the plots thanks to the pen system at night in the dellas or when the animals wandered in the fields after the harvest. Finally the meat and the skins were utilised when the animals were slaughtered. Animals to be culled were preferably sold for meat in the town centres where meat was sold and consumed.

8.6. Processing and marketing practices

Milk is processed and commercialised (Duteurtre, 1998). After a few days of fermentation milk is manually churned in a clay pot or a round gourd to obtain butter. The buttermilk remaining is used to produce a cottage type cheese, called badou in Boji. This traditional process is widely spread in the Ethiopian highlands (O'Connor, 1994). In Boji the family consumed the butter but a significant amount was sold on the local market from where it could be exported. Badou had no commercial value; the household consumed it. Draught power was exchanged in kind for a fixed quantity of grain or a share of the crops when the oxen were lent to do the work (Goubo). Manure can be used for the making of floors in houses and in harvest threshing areas. It was not used in dried form as household fuel, contrary to other systems in the highlands where wood is lacking (Lupwayi et al., 2000).

9. Conclusion

The production system found in the district of Boji showed many similarities with other mixed crop-livestock farming systems found on the Ethiopian highlands above 1500 metres. Cultivation was predominantly cereal crops. The main objective of the livestock was the use of animals for farm work and particularly oxen for traction. The district of Boji enjoys the advantages of a favourable climate (rainfall level) allowing for the growing of coffee and fruit trees but it suffers the same constraints as other highlands regions, specifically those associated with population increase and over utilisation of the soil. The special feature of the production system in the district of Boji was in its livestock practices. Cattle farming was more important there than in other similar agro-ecological zones and the practices were characterised by a high prevalence of exchanges through loans. These very complex and varied bovine exchanges had a privileged socio-economic role in the studied system. Leaving the animals in a pen at night outside in a mobile enclosure, the della, was also a specific feature of Wellega. The exchanges have a definite role in the propagation of CBPP, the subject of our interest in this zone. It is likely that these practices explain the emergence of

CBPP in Western Wellega whereas this pathology is absent in most other mixed crop-livestock systems in the Ethiopian highlands (PACE Ethiopia, 2001, personal communication). This risk factor will be further detailed through the ongoing studies on the spread of CBPP in the district of Boji.

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Figure legends

Figure 1: Map of Ethiopia with location of Western Wellega Zone and the District of Boji

Table 1

Average household size and average surface area of farms in several Zones of Ethiopia

Zones	Average household size (number of persons)	Average surface area of farms (ha)
Ethiopia	5.00	1.00
Western Wellega	5.50	1.14
North Shoa	4.39	0.68
Arsi	5.49	1.61
Gurage	4.70	0.69

Source : CSA, 2000b

Table 2

Schedule of the main types of farm work, per type of crop and per season, in Western Wellega (according to experts)

	SEASON			
	Bona december, january, february	Arfasaa march, april, may	Gana june, july, august	Birra september, october, november
Climatic event	Dry season	End of the dry season, first rains :link period	Height of the rain season	End of the rain season
Type of culture				
Maize and sorghum	fertilisation (manuring)	Ploughing (Apr.-May) sowing (May)	weeding	harvest (Oct.-Nov.)
Teff and millet	Harvest (Nov.-Dec.) threshing (Jan.-Feb.)	fertilisation	Ploughing, sowing, trampling	weeding
Yam	Planting		harvest	ploughing
Maize in « bonné »	ploughing (Dec.- Jan.), sowing (jan.)		harvest (june)	
Coffee	harvest		planting	Weeding

Table 3**Cultivated areas, production and yields of the main yearly crops in Western Wellega**

Type of culture	% of the cultivated area	% of production	Yields (Quintal/ha)
Cereals	90.0	95.0	14.7
Maize	36.1	56.5	21.8
Sorghum	22.5	21.9	13.5
Millet	14.1	9.2	9.1
Teff	12.7	4.3	4.7
Wheat	3.1	2.3	-
Barley	1.5	0.8	6.8
Legumes	6.4	3.9	8.4
Oleaginous (nug)	3.6	1.1	4.4

Source : CSA, 2000a

Table 4

Animals' departures and arrivals during the year according to the size of the herds

Size of the herd	Number of herds monitored	Average size of the herd	Departures during the year			Arrivals during the year	
			Slaughter	Sale	Loan	Purchase	Loan
0 à 10	15	8.1	0.20	0.80	2.73	0.20	1.73
>10 à 20	37	15.0	0.05	1.32	5.64	0.54	5.0
>20	18	25.2	0.22	1.00	12.0	1.11	8.44

Source of data : monitoring of 70 herds in the district of Boji in 2001

Table 5

Distribution and length of loan contracts and benefits received by each contracting party

Type of contract	Distribution per type of contract (proportionately to the number of exchanged animals)	Length of contract	Benefits for the contracting parties	
			For the lender	For the recipient
Dereba	56%	A few months	Management and feeding of his animals	Manuring
Goubo	21%	Limited : from a few days to a few weeks	Part of the recipient's harvest	Draught power, manuring
Supervision	23%	Long period of unspecified duration (> 1 year)	Management and feeding of his animals	Manuring ; partly other productions (traction, milk)

Source of data : cross sectional survey of 108 cattle farmers in the district of Boji in 2000

Table 6

Seasonal distribution of animal departures per type of loan contract

Type of contract	Season			
	Bona	Arfasaa	Gana	Birra
Dereba	76%	16%	1%	7%
Goubo	0	60%	23%	7%
Supervision	39%	36%	8%	17%

Source of data : cross sectional survey of 108 cattle farmers in the district of Boji in 2000