



# Characterization of the farming and livestock production systems and the potential to enhance livestock productivity through improved feeding in Sinja, Goba District, Bale Highlands, Ethiopia

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Through action research and development partnerships, Africa RISING will create opportunities for smallholder farm households to move out of hunger and poverty through sustainably intensified farming systems that improve food, nutrition, and income security, particularly for women and children, and conserve or enhance the natural resource base.

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# Contents

Introduction.....	1
Methodology .....	2
Study site .....	2
Sampling method .....	2
Survey structure and format .....	2
Data analysis.....	2
Major findings .....	3
Overview of the farming system .....	3
Livestock production system .....	5
Feeds and feeding .....	7
Problems, issues and opportunities .....	10
Summary.....	11
Key issues .....	11
Metrics.....	11
References.....	12

# Introduction

The highlands of Ethiopia are characterized by crop-livestock mixed farming systems. Despite enormous contribution of livestock to the livelihood of farmers in the highlands, they are faced with multifaceted problems in the production system. Studies conducted in the area (Solomon, 2004, Worku *et al.*, 2008, Dawit *et al.*, 2012) indicate that the overall shortage of feed and the seasonal fluctuation in the quantity and quality of feed are the main challenges facing livestock production.

The Feed Assessment Tool (FEAST) was used to characterize the livestock production system with a particular focus on the feed-related aspects smallholder farmers of Sinja *kebele*, Goba district of Bale highlands, Ethiopia.

The Feed Assessment Tool (FEAST) is a systematic and rapid method to assess local feed resource availability and use at site-level. It helps in the design of intervention strategies aiming to optimize feed supply and utilization through technical and organizational interventions. The objectives of the study were to provide an overview of the farming system and to identify the major livestock production problems, opportunities and potential interventions with particular emphasis on livestock feed aspects for improving the production and productivity of livestock.

# Methodology

## Study site

The study was conducted in Sinja *kebele* of Goba district. Goba is located in Bale highlands in the South Eastern part of Ethiopia. The altitude of Sinja is 2603 meters above sea level (m.a.s.l). It lies 5 km from Robe, the administrative center of Goba district. The GPS coordinates of Alloshe are 07 02 27.2N and 039 58 25.2E.

## Sampling method

The team from SARC and ICARDA held discussions with focal experts from zonal and district agricultural offices prior to the site and farmer selection. The general objective of the study and the long-term benefits of the farming community from the survey were discussed. Based on basic information available at district level, the study *kebele* was selected with the participation of the District Livestock Officer. The potential of the *kebele* for livestock production and the accessibility to the main highway were considered in selecting the *kebele*. Subsequently, the selected *kebele* in the district was visited and discussions held with the Development Agents. The Development Agents were given guidance to select 18-20 farmers, both male and female, based on the size of land holding.

## Survey structure and format

A total of 17 farmers (13 male and 4 female) were selected for the study. All the selected farmers participated in a focus group discussion to provide an overview of the farming and livestock systems and to identify constraints and opportunities for improving livestock production in the area. Nine key informant farmers, 3 from each category of landholding (large, medium and small) were selected and individually interviewed.

## Data analysis

The FEAST excel macro program ([www.ilri.org/feast](http://www.ilri.org/feast)) was used for data analysis. Narrative responses collected from the group discussions were examined and reported.

# Major findings

## Overview of the farming system

Mixed crop-livestock farming is the dominant type of farming system in Sinja *kebele*. Landholding among farmers ranges from 0.5 to 20 ha. The majority of households are medium scale famers with land size of 1 to 5 ha (Figure 1). The proportion of landless farmers is about 5% of the total households in the *kebele*. More than 75% of the land area is used for crop cultivation. Farmers allocate the major proportion of the cultivated land for production of food crops. Private land not used crop cultivation is mainly used for grazing and in some cases for eucalyptus plantations. The average household size ranges from 4 to 6.

The farmers mentioned that Sinja has two cropping seasons namely *genna* and *bona*. *Genna* extends from April to August while *bona* start in July and extends up to January (Table 1). *Bona* is the main cropping season. More crops are grown during this season. During *genna* season, planting starts in April while harvesting is done in the months of August. During *bona*, planting is in July-September and harvesting is completed in January.

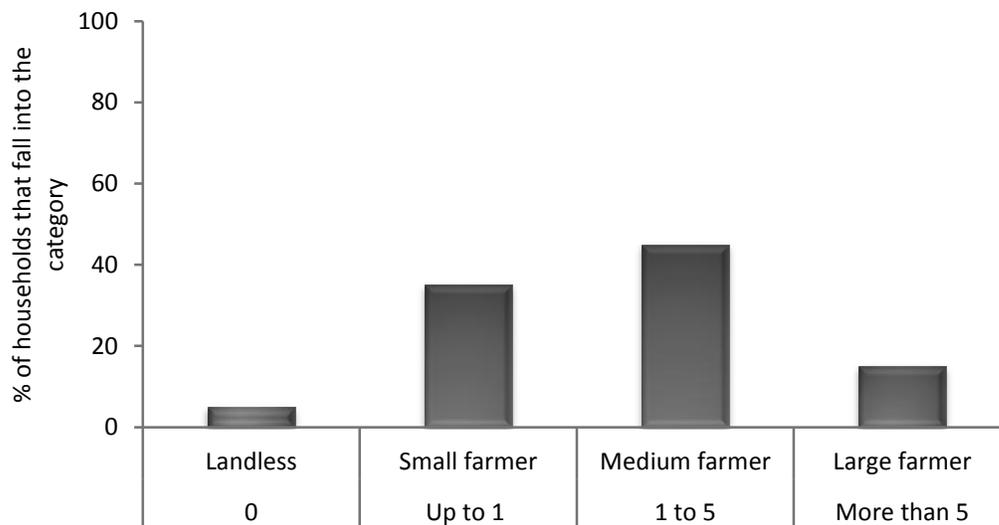


Figure 1: Households (%) in various categories of land size in Sinja *kebele*

Table 1: Cropping seasons in Sinja *kebele*

Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Genna</i>												
<i>Bona</i>												

The majority of the farm land is used for production of cereal crops. The dominant crops grown are wheat, emmer wheat, barley and broad beans as shown in Figure 2. Cereals crops are mainly produced during *bona* while more pulse crops are produced during *genna*.

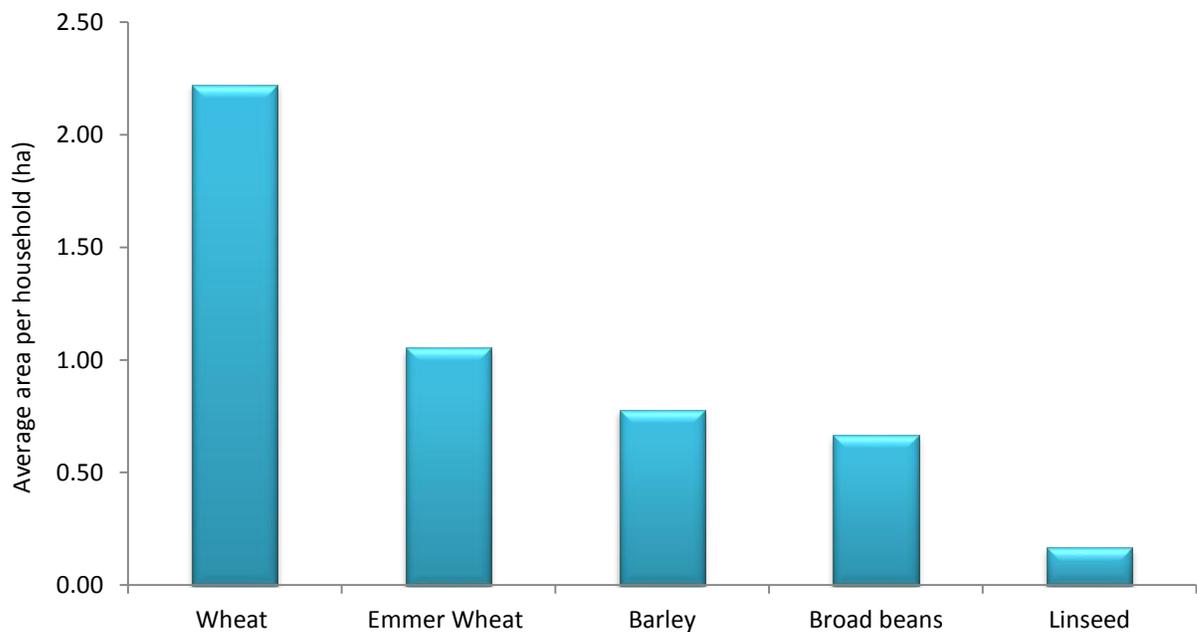


Figure 2: Major crops grown in Sinja area

There is a water source available for irrigation in the area. About 10% of households from the community have access to irrigation. Hired labourer is not easily available throughout the year. The requirement is very high during planting and crop harvesting. Moreover, hired labour is used when a household has insufficient family labour to complete the farm tasks especially when children go to school. There are two types of hired labour, daily labourer and labour hired on a contractual basis (mostly for a year). The cost of daily labour varies depending on the type of the work and agreements made between the employer and daily labourer. The cost is higher for crop harvesting as compared to planting and weeding. If the activity is planting and weeding, the cost is Birr 40 to 50 (\$2-2.5). The cost is doubled when draft oxen are owned by the labourer. The cost for harvesting wheat or barley with an area of 32x32m<sup>2</sup> is about Birr 150 to 200 (\$ 7.5-10). Lunch and additional service are negotiable. If the labourer is hired on a contractual basis for a year, the agreement for payment is in kind or in cash. Usually, 0.25 to 0.5 ha of crop land plus Birr 200 ETB (\$10) is paid. Agricultural inputs such as seed and fertilizers are

provided by the employer. The hired labourer is also provided with accommodation, food and cloths. Apart from these, labour exchanges among relatives are also practiced.

The main sources of income of households in Sinja are from the sale of crops (Figure 3). Crop production contributes about 74% of all household income. This is because crop production is the major agricultural activity farmers rely on in this area. When crop yields fail, farmers forced to sell animals (mainly sheep) to purchase food grain and to cater for other important family needs. Most of the farmers undertake off-farm activities to supplement their agricultural income. A popular off-farm activity that contributes to household income is brewing and selling of traditional beer by women.

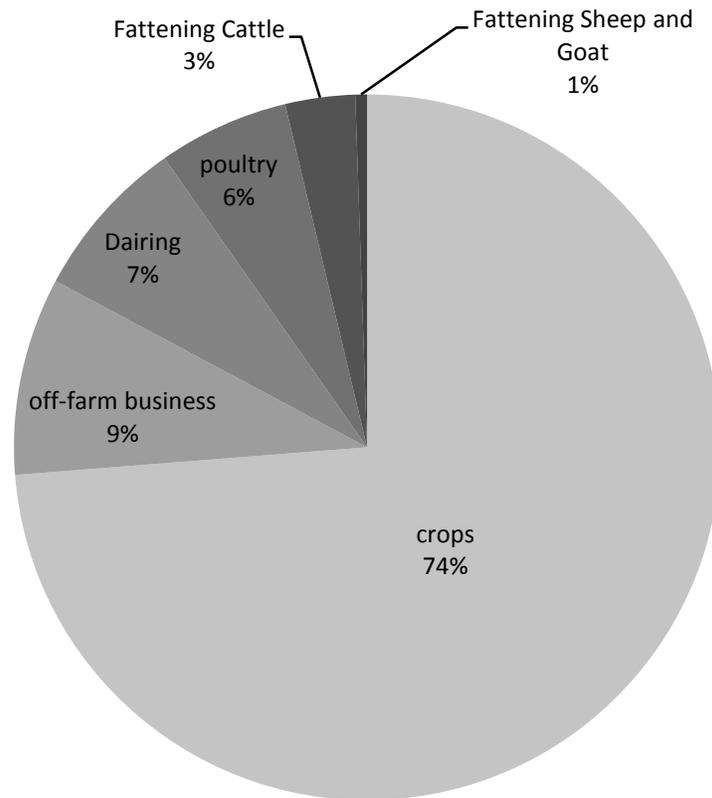


Figure 3: Contribution (%) of livelihood activities to household income

## Livestock production system

Beside crop production, livestock husbandry is also an important activity and livelihood source for the farming community in Sinja. A typical herd structure comprises predominantly of cattle (Figure 4). Sheep, goats, horses, donkey and chicken are also found in households. The livestock production system is almost entirely traditional with predominantly local cattle breed types. The herd structure and composition of livestock varies per household. The average number of local dairy cows and draft cattle are 2 and 4 respectively. The proportion of improved breeds (crosses of local and Friesian Holstein cattle) is about 4%. Cattle are mainly used for draft power, milk and meat production, income, manure for fuel and soil fertility. In addition, draft cattle are used

for threshing. Cattle fattening is not widely practiced. Milk production from local dairy cows depends on the feed availability. The average yield ranges from 2-4 liters/day. Reproductive efficiency of cattle is poor mainly due to management problems, shortage of feed and high prevalence rate of reproductive diseases.

The primary purposes of keeping small ruminants are for cash income and as a source of meat. In times of insufficient crop harvest, small ruminants are the first animals to be sold to cater for family needs. Donkeys and horses are the most valuable pack animals for transportation of people and other materials in the area. Horses are used mainly for transporting people and fire wood to the market while donkeys are used solely for transporting different items such as farm equipment, harvested grains or crop residues from the farmland to homesteads and market places. Traditional backyard system of chicken with free-ranging is the common practice.

Chickens are mainly kept as sources of eggs and meat for the family and as immediate sources of cash for family needs. Large ruminants and equines are housed overnight in open enclosures. Government and private animal health clinics are not available in the *kebele*. Farmers travel about 5 km to get animal health services. The cost of treatment and drugs is very high at private clinics. Artificial insemination service has been started in the area to improve the performance of local cattle breeds. However, the service is not efficient because of the number of repeat services required for a cow to conceive. Although the service is supposed to be free, most farmers indicate that they are charged Birr 4 (\$0.2). Using improved bulls is also common at a fee of Birr 40 - 70 (\$ 2-3.5) per service.

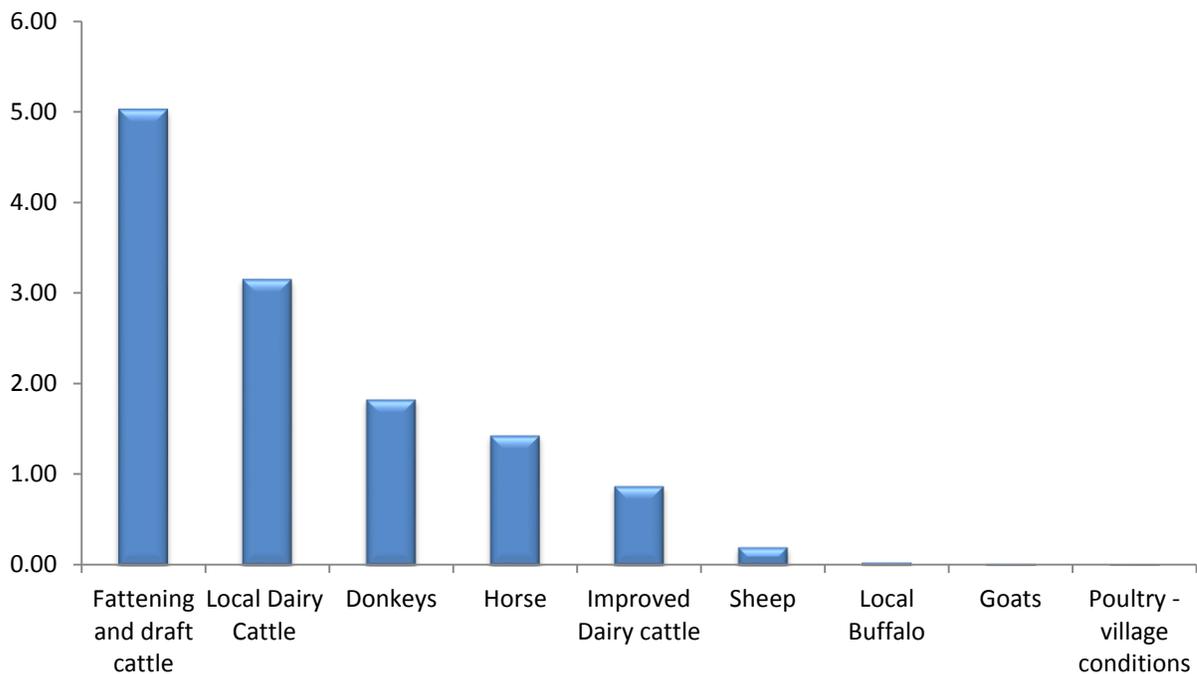


Figure 4: Average livestock species holdings per household in Tropical Livestock Units (TLU)

## Feeds and feeding

Grazing lands, crop residues, crop stubbles and fallows lands are the major feed resources in the area. Grazing private land is a common practice. Communal grazing land is not available in the area. Animals are usually not allowed to graze during the wet season so as to allow the pastures to regenerate. Animals are allowed to graze after the regeneration of the grazing lands while some of the pasture grasses are left for hay production. Land used for grazing is the land unsuitable for crop production. Some plots of land are left fallow to restore fertility of the soil. Crop stubble is one of the important feed sources. After harvesting the crops, livestock are allowed to graze stubble of different crops. For the first few days, the stubble is grazed by the animals of the farm owner and later it becomes accessible to all animals in the community.

Grazing contributes about 17, 16, and 19% dry matter (DM), crude protein (CP) and metabolizable energy (ME) respectively of the total diet (Figure 5). The priority for grazing rehabilitated grazing lands is to draft cattle, milking and pregnant cows and calves. However, private grazing land area has declined because of land redistribution and the expansion of crop production. Moreover, high livestock pressure, shortage and erratic rainfall have contributed to the current degradation and poor productivity of the grazing land. Poor knowledge of the farmers on improved management of the grazing land is also another factor. Hence, the feed obtained from grazing lands is inadequate both in terms of quantity and quality throughout the year

Residues from cereal and pulse crops are the major feeds for livestock in the months of December to May when grazing land is not available to livestock (Figure 5). They contribute about 46% of dry matter (DM) to the total diet (Figure 5). Straws of wheat and barley are the dominant cereal residues. Pulse straws like faba bean and field pea straws are commonly available pulse straws in the area. Crop residues are also the major contributor to crude protein (CP) and dietary metabolizable energy (ME) contributing 30% and 37% respectively (Figure 5). In spite of the huge crop residue as animal feeds, there are constraints to the efficient utilization due to their poor nutritive values. Generally, the dependence of crop residues for livestock feed is increasing as more grazing lands are cultivated to satisfy the grain needs of the rapidly increasing human population. Hence, more efficient management and utilization of the available huge resources of crop residues may help to improve livestock production in a sustainable manner.

Production of cultivated forage species is not widely practiced by most farmers in the study area. However, efforts are being made to encourage the cultivation of improved forage species of oats and vetch through the District Agricultural Offices. Some households produce fodder oats and feed for crossbred cows and draft cattle. Shortage of forage seeds and awareness about the importance of the improved forage species are the major constraints.

Farmers purchase concentrated feeds such as wheat bran and linseed cake. These are available in the nearby local markets. Supplemental feeds such as the by-products of grain and oil seed mills are fed to livestock by mixing them with cereal straws especially when there is shortage of feed during the dry periods. Priority of feeding of concentrates is given to cross-bred dairy cows, fattening animals and calves.

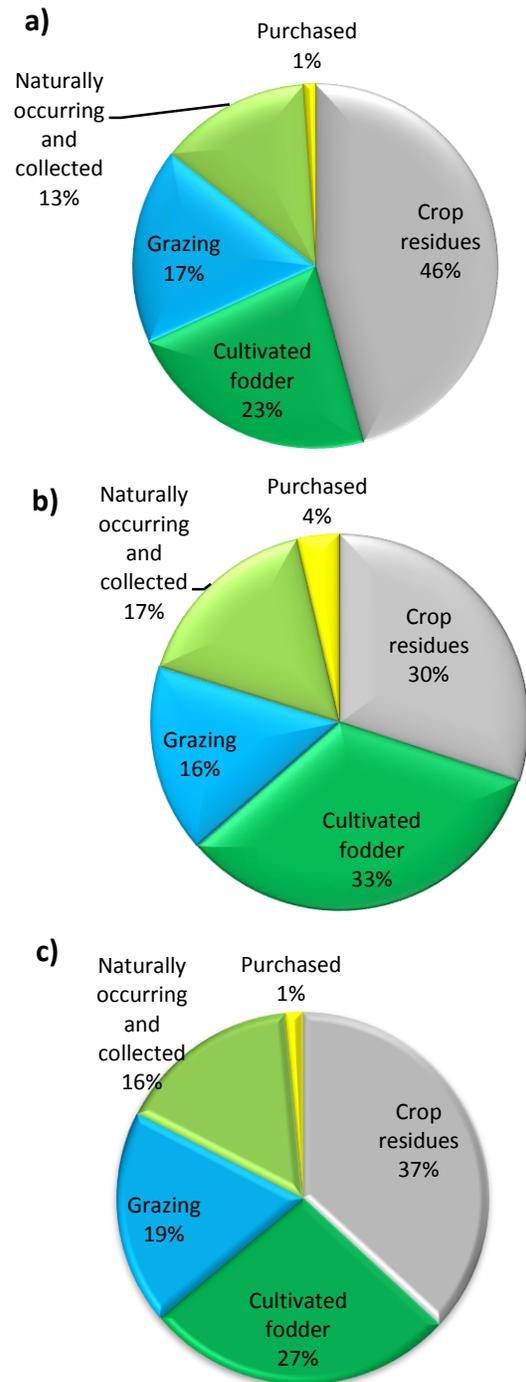


Figure 5: The contribution made by the various feedstuffs to DM (a), CP (b) and ME(c) of the livestock diet in Sinja

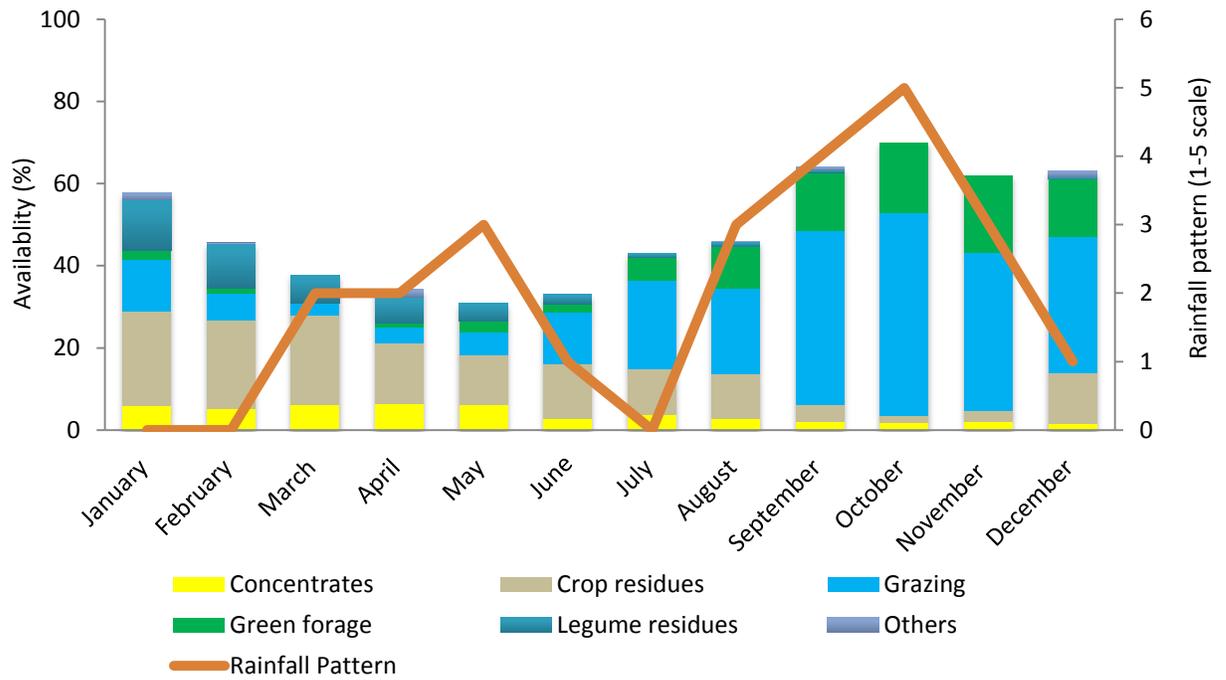


Figure 5: The composition of the diet in Sinja *kebele* throughout the year in relation to the rainfall pattern

## Problems, issues and opportunities

The important livestock problems and the appropriate improvement options suggested by the farmers are summarized in Table 2 below.

Table 2: Livestock-related problems identified by farmers in Sinja and the corresponding solutions that were suggested by farmers

<b>Problem (in order of importance)</b>	<b>Problems identified</b>	<b>Proposed solution by the farmers</b>
1	Incidence of disease and parasites	<ul style="list-style-type: none"> <li>• Establishment of animal health clinics with adequate manpower and facilities.</li> <li>• Improving management of animals so as to minimize the risks of disease</li> </ul>
2	Cash shortage	<ul style="list-style-type: none"> <li>• Strengthening cash credit and agricultural input providers such as cooperatives</li> </ul>
3	Shortage of improved cattle breeds	<ul style="list-style-type: none"> <li>• Selection of the most promising and productive animals from local breeds</li> <li>• Cross breeding of indigenous breed with exotic cattle</li> <li>• Use of improved bull service</li> </ul>
4	Poor management due to awareness	<ul style="list-style-type: none"> <li>• Improve awareness of the farmers through training</li> </ul>
5	Shortage of feed in quantity and quality	<ul style="list-style-type: none"> <li>• Improving the productivity of the grazing land through growing productive forages</li> <li>• Using supplemental feeds such as agro-industrial by products for improving crop residue utilization</li> <li>• Decrease the number of local breeds and replace by few improved and productive breeds</li> <li>• Training on feed resource utilization and management</li> </ul>

Farmers in this area do not consider feed availability as a major constraint. Interventions targeting this area should focus on improving the quality of existing feed resources as opposed to introducing new feeds. Particular attention should be paid to improving the nutritive value of cereal and pulse crop residues which are in abundance in Sinja.

# Summary

## Key issues

- Incidence of disease and parasites
- Cash shortage
- Shortage of improved cattle breeds
- Poor management due to awareness
- Shortage of feed in quantity and quality

## Metrics

- Milk yield: 360 liters per cow per year
- Meat off take: not applicable

## References

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