



# Characterization of the farming and livestock production systems and the potential to enhance livestock productivity through improved feeding in Upper Gana, Lemo Hadiya District, 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.

The three regional projects are led by the International Institute of Tropical Agriculture (in West Africa and East and Southern Africa) and the International Livestock Research Institute (in the Ethiopian Highlands). The International Food Policy Research Institute leads the program's monitoring, evaluation and impact assessment. <http://africa-rising.net/>



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# Introduction

Livestock production plays an important role to the economy of smallholder farmers and the national economy in Ethiopia. Both farming and pastoral households are largely dependent on livestock for their livelihood systems. Livestock generate more than 85% of the farm cash income. In terms of contribution to the national economy, livestock contribute about 13-16% of total GDP, and the share to total exports is about 16%. However, the level of contribution from the livestock sub-sector is generally low compared to other African countries. There are a multitude of constraints that influence the productivity of livestock.

Livestock production in the Southern Nations Nationalities and Peoples Regional State (SNNPR), as in many parts of Ethiopia, is traditional and generally dependent on crop residues, natural grazing/browsing, hay from natural pastures, agro-industrial by-products, crop thinning and defoliation from annual crops and perennial crops and to some extent on introduced forage crops.

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.

FEAST was used to characterize the livestock production system and in particular feed-related aspects of smallholder farmers of Upper Gana *kebele*, Ethiopia. The feed assessment study was conducted on December 19-20<sup>th</sup>, 2013 by researchers from Worabe Agricultural Research Center (WARC), Areka Agricultural Research Center (AARC) with backstopping from the International Center for Agricultural Research in the Dry Areas (ICARDA). The objective of the study was 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 Upper Gana *kebele* which lies 246km South of Addis Ababa. Upper Gana is administratively located in Lemo woreda, Hadiya zone of SNNPR. It is located 13 km Northwest of Hossana town. The *kebele* is characterized by a crop-livestock system with a strong perennial crops component. The *kebele* has a bimodal rainfall pattern. Total households of the *kebele* are 796, of which 710 are male and 86 are female-headed.

## Sampling method

Prior to site and farmer selection, the team from WARC and AARC held discussions with focal experts from zonal and district agricultural offices on the general objective of the study and the long-term benefits of the farming community from the project. The potential of the *kebele* for livestock production and the accessibility to the main highway was considered in selecting the *kebele*. Subsequently, the selected *kebele* in the district was visited and discussions held with their respective Development Agents. The Development Agents were given guidance to select 15-20 farmers, both male and female, based on the size of landholding.

## Survey structure and format

19 farmers (6 women, 13 men) participated in group discussions using the participatory rural appraisal (PRA) approach to provide an overview of the farming system and to identify constraints and opportunities for improving livestock production in the *kebele*. Key informant farmers were selected from each category of land holding (small, medium, large) from the discussion group. Accordingly, 9 farmers, 3 from each category of land holding were purposively 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

The farming system is classified as a mixed cereal-livestock production system with a cereal dominant cropping system. The farm land varies among the households. Majority of the households fall in the category of medium farmers with 1.25 to 2 ha of land (Figure 1). There are no landless farmers in the *kebele*. The average family size is 8 people per household.

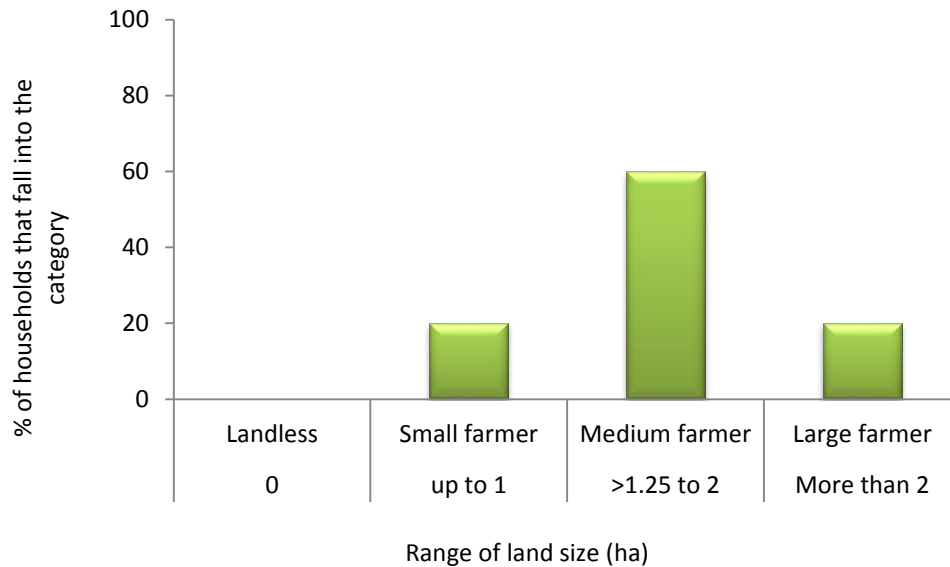


Figure 1: Average land size owned by various categories of farmers in Upper Gana

Farmers described two distinct seasons favorable for crop production. The two seasons are locally named by the time of crop harvest. The season, which extends from March to July is named *Belg* while the season from June to December is called *Meher*. Among the two cropping seasons, *Meher* is the main season and is very important for crop production because of the long and intense rainfall during this period.

The dominant crops grown are cereals (wheat, tef and maize), highland pulses (faba bean) and enset as shown in Figure 2. Most of the farmers use their farm land for cultivating cereal and pulse crops alternatively in the two cropping seasons. Fallowing is practiced in study area. There are no fodder crops grown in the study area. The crops grown are mainly used as a means of income generation whereas residues from cereal and pulse crops are the major source of livestock feed. Crop residues are also used for income generation, mulching to improve the soil and as raw material for wall construction of local houses.

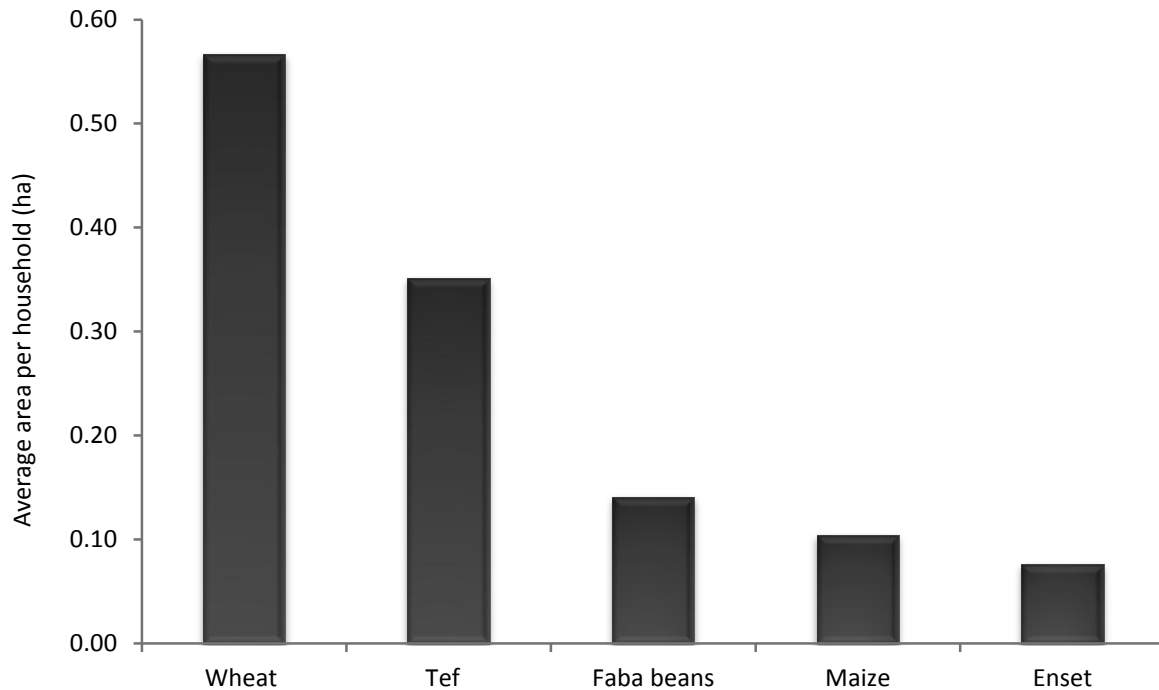


Figure 2: Major crops grown in Upper Gana

Crop production is rain-fed and irrigation-based. Since land preparation and harvesting of crops is mechanized, the requirement for daily labourers is not a critical problem for majority of the farmers. However, labour is required during planting (especially for farmers using oxen to plough their farm land), weeding (herbicide application) and crop residue collection from the farm. The cost of labour is approximately 40 Ethiopian Birr (ETB; USD 2.22) per day. Cereals are the main source of income contributing to about 31% of the household income. Cash crop production, particularly chat, is also an important livelihood activity contributing about 16% of the total household income. Labouring, remittance, beekeeping, draft animals and animal fattening are also a means of income generation for the farmers (Figure 3).

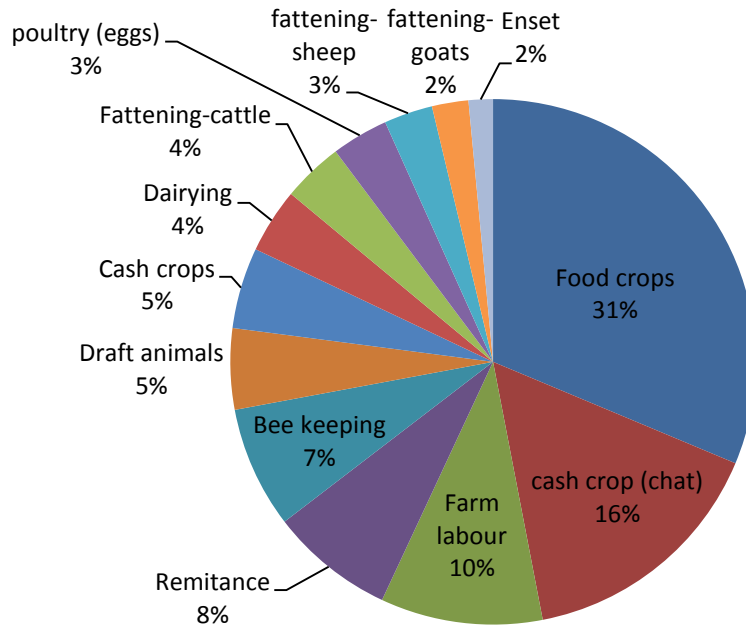


Figure 3: Contribution (%) of livelihood activities to household income in Upper Gana

## Livestock production system

The livestock production system in the study area is mainly extensive. Local breeds are predominant and are characterized by low milk production. Cattle and small ruminants are the most important livestock species in Upper Gana. Cattle are mainly kept for the purpose of draft power, manure, meat, milk and cash income. Activities such as ploughing and crop threshing are performed by cattle (mainly by draft animals). Small ruminants especially sheep are also a major source of meat, manure and cash.

Cattle are the most important livestock species in the area (Figure 4). Farmers reported that approximately 98% of the households own local dairy cows, whereas about 85%, 75%, 65%, 45%, 25% and 10% of the households own donkey, village poultry, draught cattle, sheep, goats and mules respectively. Only 2% of the household keep improved cattle breeds. The average milk yield from the local dairy cow is about 1.5 liters per cow per day. The production of milk mainly depends on feed and water availability. Most farmers house their livestock in their houses because of fear of predators, theft and chocking from ropes that tie them.

Upper Gana has no animal health clinic equipped with commonly required health technicians, equipments and drugs. Hence, veterinary services are not easily available when required by the farmer. Because of these problems the farmers in the study area travel to the nearby Gombora *woreda* for veterinary services. The cost of treating an animal depends on the type of treatments. On average 25 Ethiopian Birr (ETB; \$ 1.3) is charged for treating a sick animal.

Artificial insemination (AI) is not available due to semen shortage, distance from the source and unavailability of technicians in the area. Farmers use their own local bull service. Improved bull service is not commonly used.



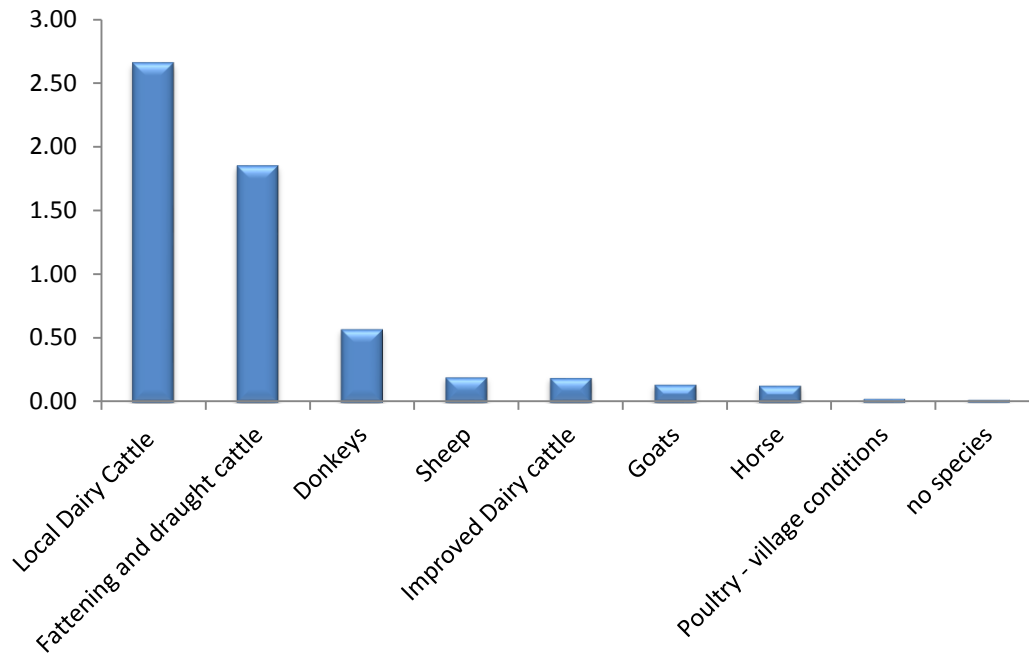


Figure 4: Average livestock species holdings per household in Tropical Livestock Units (TLU)

## Feeds and feed resources

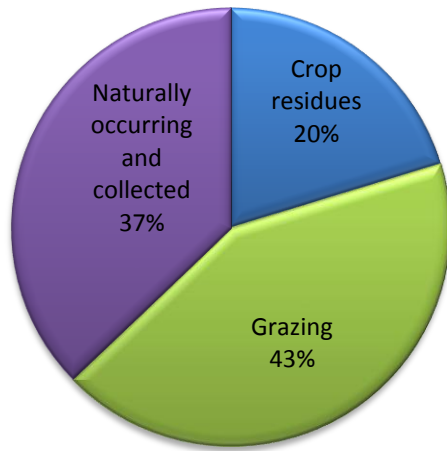
Naturally occurring grasses, stubble grazing and crop residues are the major feed resources. The major share of livestock feed is obtained from naturally occurring grasses which contribute approximately 37% of dry matter (DM) of the total diet (Figure 5). Stubble grazing is also the major contributor to dietary metabolizable energy (ME) contributing 43%. Cereal straws such as wheat, tef and maize are the dominant crop residues. Faba bean residue is also commonly used as animal feeds. There is wastage of crop residues since all of the residues are not well collected from the threshing ground. The collected residues are piled in stacks near homesteads and animals are given small quantities in the morning and evening. Draft oxen are fed on the residues before and after work. Some farmers combine cereal and pulse residues and store them around the homestead. These residues are mainly fed when grazing land is very scarce.

Majority of farmers do not grow improved forage crops although they have great interest to. Lack of forage seed and poor extension services are some of the reasons that limit utilization of forage crops. Grazing is practiced throughout the year (Figure 6). Grazing is usually done around the homestead, on community land, by the roadside and on marginal land. Aftermath grazing, following the crop harvest also provides feed for all classes of livestock. Naturally occurring local grasses is a good source of feed during the rainy seasons. They contribute about 46% of CP to the total diet of the existing feed resource.

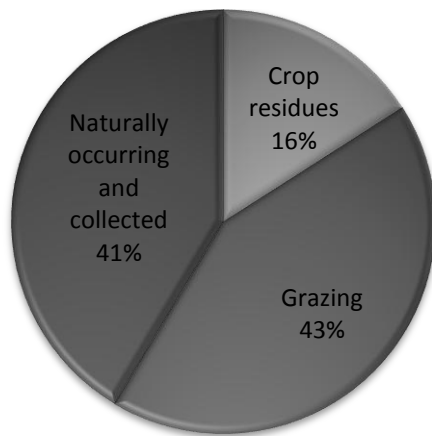
Farmers do not regularly use agro industrial by products due to their high cost.

Generally, farmers indicate that feed shortage is critical from the end of January to beginning of May (Figure 6). During this period, the availability of grazing pasture and green forage resource is very scarce and livestock rely mainly on crop residues which are low in feeding value.

(a)



(b)



(c)

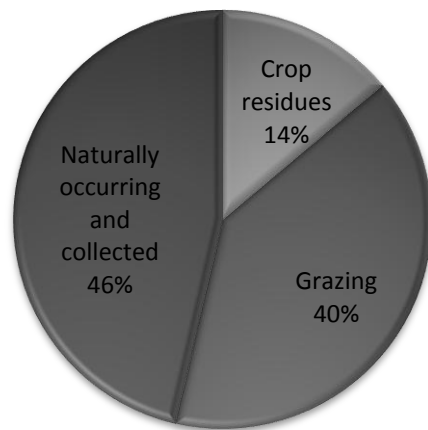


Figure 5: The contribution of various feedstuffs to (a) DM, (b) ME (c) CP to livestock diets in Upper Ghana

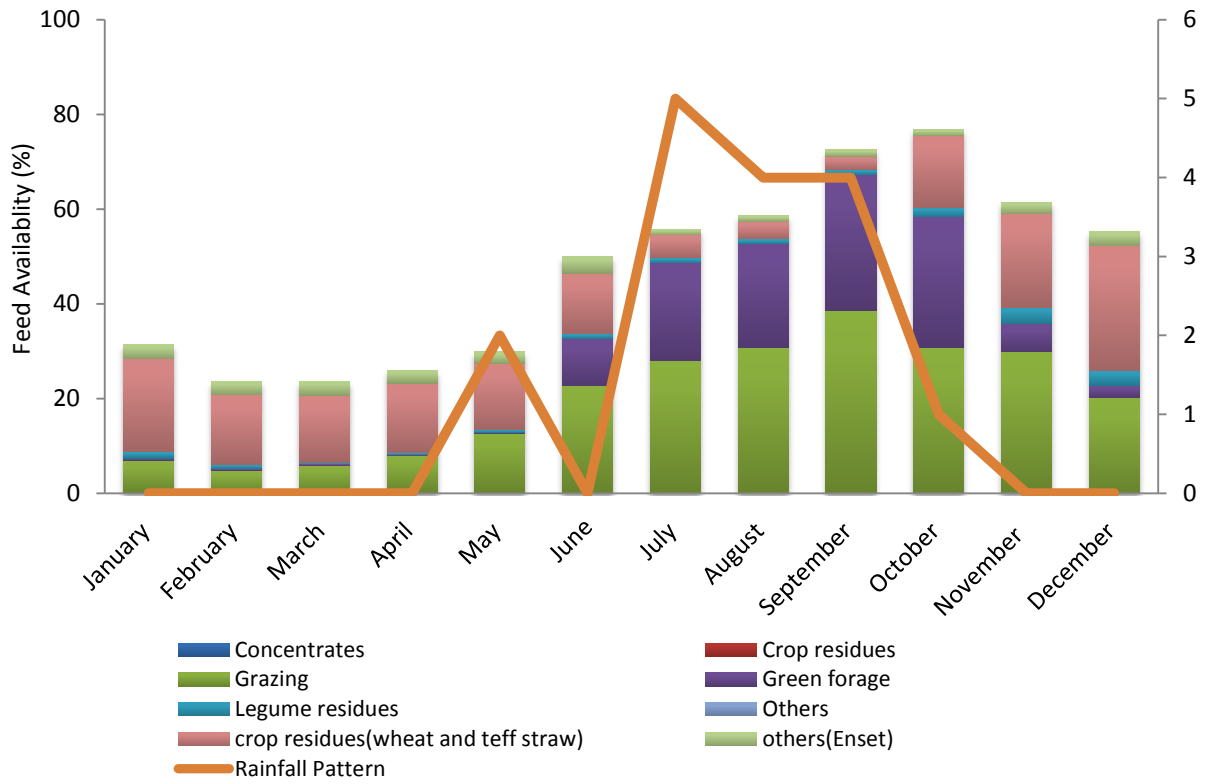


Figure 6: The composition of the livestock diet throughout the year in relation to the rainfall pattern in Upper Ghana

## Problems, issues and opportunities

The important livestock-related problems and the appropriate improvement options suggested by the farmers are summarized in Table 1 below: Disease incidence, water and feed are the key problems.

Table 1: Livestock-related problems identified by farmers in Upper Gana and the corresponding suggested coping strategy and solutions

Problems (in order of importance)	Problems identified	Copping strategy	Proposed solution by the farmers
1	Incidence of disease and parasites (external and internal parasites), FMD, respiratory illness esp. in small ruminants	Use traditional treatments like <i>girawa</i> (local shrub) and tobacco	<ul style="list-style-type: none"> <li>▪ Establishing veterinary clinics with manpower and drug supplies</li> </ul>
2	Inadequate source of clean water	Walking about 6km to fetch water for human and animal drink from farmers' homesteads	<ul style="list-style-type: none"> <li>▪ Better management of the existing water resources, collecting rain water for dry periods, utilizing the existing limited water sources by making water reservoirs or ponds. Extracting the ground water with the assistance of government and non-government organizations.</li> </ul>
3	Shortage of feed in quantity and quality	Use crop residues, enset leaves and purchasing natural grasses	<ul style="list-style-type: none"> <li>▪ Proper utilization of the existing feed resource such as crop residues and grazing lands</li> <li>▪ Allocate some portion of their land for feed production (for cultivated forage)</li> <li>▪ Minimize the number of animals to few improved and productive ones</li> </ul>
4	Insufficient supply of Improved breed	Use local and improved bulls	<ul style="list-style-type: none"> <li>▪ Adequate and timely provision of AI services by the government and other organizations</li> <li>▪ Provision of improved animal breeds by government and other organizations</li> </ul>

## Conclusions

There is a need to integrate resource management and animal health interventions to improve livestock productivity in Upper Gana. Supplementation feeding practices are key to solving the livestock feed issues because of the limited access to green fodder because of restriction to cropping land. Farmers can also be encouraged and supported to cultivate and harvest their own fodder seed as they have shown interest in this area.