Characterisation of the livestock production system and potential for enhancing productivity through improved feeding in Sebusaray woreda of Baako, Ethiopia, May 2010

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The Feed Assessment Tool (FEAST) is a systematic method to assess local feed resource availability and use. It helps in the design of intervention strategies aiming to optimize feed utilization and animal production. More information and the manual can be obtained at www.ilri.org/feast

FEAST is a tool in constant development and improvement. Feedback is welcome and should be directed to feast@cgiar.org. The International Livestock Research Institute (ILRI) is not responsible for the quality and validity of results obtained using the FEAST methodology.

The Feed Assessment Tool (FEAST) was used to characterize the livestock production system and in particular feed-related aspect in the Sebusaray woreda of Baako, Ethiopia. The assessment was carried out through structured group discussions and completion of short questionnaires by three key farmers/stakeholders on the 12th of May 2010. The following are the findings of the assessment and conclusions for further action.

Farming system

The area is a mixed crop/livestock system characterised by small land holdings of approximately 2 hectares per household. The primary focus of the system is cereal crop production. Livestock are integrated into this system to support cropping operations. Cereal crops, namely maize (Zea mays) and tef (Eragrostis tef) are the main crops grown within the area. Other cereal crops such as; sorghum (Sorghum bicolor) and finger millet (Eleusine coracana) are also grown, however, the areas sown to these crops are minimal and restricted to only a few farmers. Noug (Guizotia abyssinica) and green peppers (Capsicum annuum) are also grown by some farmers. The amount of land used to produce these crops is highly variable. Cattle are the most important livestock species kept within the area as they provide the draught power and manure fertiliser required for effective crop production. Sheep, goats, and poultry are kept in varying numbers by most households for household consumption and sale when disposable income is required. Labour availability has become a problem of recent times as large numbers of children leave the area for schooling. This has decreased the size of the family labour force. Many farmers now hire labour for approximately 10Birr/day including meals during periods of peak labour requirements such as planting and harvesting. Water is becoming problematic for many farmers as rainfall during the dry season is not sufficient enough to allow effective cropping operations to be carried out. The increased population density of the area also means irrigation is no longer a viable means of overcoming insufficient rainfall levels.
**Major income sources**

Maize is the main source of income contributing an average of approximately 75% of all household income. Livestock contribute approximately 10% to household income through the sale of old draught animals that are no longer strong enough to pull the plough, sale of shoats and poultry for slaughter and the sale of manure for fertiliser. Interestingly, no income was received from the sale of milk as milk yields are not sufficient enough to warrant excess being sold. All milk that is collected is consumed within the household. Other sources of income include cash crops such as coffee (*Coffea arabica*) and khat (*Catha edulis*) which contribute 10% and 5% to household income respectively. However, the extent to which these crops contribute is highly dependent on yields. This is particularly true with coffee crops which are susceptible to numerous diseases within the area that significantly affect yields.

**Livestock production system**

Cattle are the most important livestock species as they support the production of crops through the provision of draught power. Every household has at least 2 castrated males for draught purposes and a cow to fulfil household milk requirements. The manure produced by these animals is also collected and used as a cheap and readily available source of fertiliser. The system relies heavily on grazing to fulfil the nutritional requirements of the animal. Cattle spend daylight hours grazing household lands, returning to a circular corral made of *Acacia spp.* branches at night. During time spent in the corral, the cattle are often given supplementary feeds such as crop residues and cut green forages. Veterinary care is inaccessible for many farmers in the area as the nearest veterinary clinic is approximately 8 kilometres away. This poses significant problems if the veterinary is unwilling (or unable) to visit the area due to poor road conditions (particularly during the wet season) and the animal is unable to walk to the clinic. Artificial Insemination (AI) services are not present within the area. At present, all farmers utilise freely available natural matings with indigenous bulls. Selection of bulls for mating is not based on characteristics or desirable traits possessed by the bull; it is simply a matter of whichever bull happens to be in the area at the time of oestrous. Due to the lack of water availability donkeys are also considered important for most
households. Almost every household has at least one donkey. The donkeys are used to carry water from nearby rivers and bores.

Problems, issues and opportunities

There are many problems faced by farmers in this area. Lack of feed is the main constraint faced by farmers, particularly towards the end of the dry season (January-March). This problem has been observed worsening over the past decade as the population density of the area increases. The increasing population density has caused the size of land holdings to decrease as plots of land are divided amongst family members. This is placing increasing pressure on finite feed resources. The increasing population density is also affecting water availability and quality. Clean, fresh water is currently only available during the wet season. As a result water borne diseases such as Liver Fluke (*Fasciola hepatica*) are a serious concern for farmers. Other diseases such as trypanosomiasis, foot and mouth disease, anthrax, and black leg are also prevalent within the area and are viewed as constraints to improving livestock production. The local extension service is also considered to be playing a role in preventing the development of livestock production within the area as farmers believe they are largely ineffective. The extension service has thus far been unable to help farmers control or mitigate the effects of disease in their animals or train them on ways to overcome feed scarcities and methods of water conservation.

Major feed sources through the year

The main feed sources relied on by farmers throughout the year come from grazing and green forages. Grazing is restricted to the farmers own land as there are no communal grazing areas available. In an attempt to overcome this restriction, many farmers fence off part of their lands during the wet season to conserve plant material for periods when pasture availability begins to decline during the dry season. These fenced areas are cut periodically or grazed directed when the farmer deems it necessary. In addition to these conserved areas, farmers cut naturally occurring
pastures from nearby roadsides or forest areas to supplement fodder found on farm. At times when pasture growth is low and finding adequate quantities of green forage becomes difficult, farmers resort to feeding crop residues, particularly from November – February. Farmers have a preference for Tef residues and tend to store all the Tef residues at the end of the growing season, whereas they will only store approximately ¾ of all Maize residues. Concentrate feeds compose a very small fraction of the diet. Concentrate feeds usually consist of Noug cakes which are purchased for 40Birr for 100 kilograms. Due to the relatively high economic value of concentrate feeds farmers utilise a strategic feeding system in which only dairy cows receive the concentrate feed during lactation periods. However, only a small minority of farmers feed concentrates and it is not a common practice in the area.

![Available feed resources in Sebusaray woreda, Ethiopia](chart.png)

**Potential interventions**

The contribution livestock make to household income in this area is relatively minimal. Alleviating the constraints will improve livestock productivity and ensure a greater contribution to household income can be achieved from livestock products. To mitigate the effects of insufficient feed it will be necessary to better utilise the feed sources currently available, increase feed biomass production on-farm and potentially purchase more concentrate feeds. At present, not all the maize residues are being collected and stored for later feeding. This may represent a significant wastage of feed material that could be utilised during periods when feed availability is low although leaving stovers in the field may be strategic to maintain soil fertility. Steps could also be taken to improve the quality of the residue material through the use of simple technologies such as chopping (or chaffing) the residues and mixing them with more palatable feed stuffs, such as molasses. To increase on-farm fodder production, the use of fodder crops could be considered. As farmers in the area already fence sections of their land to conserve stands of fodder for the dry season, planting these areas with fast growing fodder species such as Napier grass (*Pennisetum purpureum*) could be advantageous. It would allow the farmer to cut the area numerous times throughout the season and produce much more feed per hectare than could otherwise be achieved with naturally occurring grasses. Leguminous forage species such as Lucerne (*Medicago sativa*) could also be considered to help
improve soil fertility. The use of these fenced areas for fodder crop production in a “cut and carry” operation would also have the added benefit of providing large quantities of fodder in close proximity to the household. This would reduce the labour intensity of the feeding system and the time spent collecting fodder material. Additional concentrate or industrial by-products can also be purchased, however, this would not be recommended at this time as it will greatly increase the cost of production which is unlikely to be offset due to the low productivity of the indigenous cattle that dominate holdings. Thus, attempts could also be made to develop AI services to ensure farmers can upgrade the merit of their herd to ensure higher productivity is genetically possible.

Mitigating the effects of disease can be achieved through increasing farmer awareness of the important disease issues such as, disease identification, preventative techniques and quarantine procedures. Veterinary services in the area could also be improved to ensure farmers have access to the necessary treatments in the event of disease outbreak. Similarly, improved water availability and quality can be achieved through increasing farmer understanding of water contaminating agents, and methods for water conservation such as the introduction of water tanks (where possible) and building of dams to capture water during rainy periods.

Extension services in the area will have an integral role in the introduction of any potential interventions as Ethiopian government mandates dictate that government extension services must be involved and are responsible for the introduction of new agricultural techniques and technology. Thus, to sustainably mitigate the effects of constraints within this area, it will be necessary to strengthen extension services through the use of additional training programs, further education and increased funding opportunities to ensure an appropriate budget is available for extension officers to carry out their mandated tasks. Mitigation of the other constraints is unlikely to occur without strengthening of government extension services.

**Key issues**

- Lack of feed sources, both in terms of quality and quantity
- Poor water availability and quality
- High disease prevalence affecting animal health and productivity
- Ineffective extension services

**Ways forward**

- Introduce fodder crops to improve the quantity and quality of feed available.
- Introduce simple feed processing technologies to improve the quality of existing feed.
- Provide training to farmers in techniques of disease prevention and quarantine practices.
- Improve access veterinary services.
- Increase awareness amongst farmers about sources of water contamination and methods of water conservation.
- Strengthen the capacity of extension services to provide training and support to farmers.

**Key metrics**

- Milk yield: 320 litres per household per year
- Meat offtake: 5.46% per household per year
- ME per TLU:
Conclusion

Farmers in this mixed crop/livestock system rely heavily on maize production as a means of income generation. Livestock’s primary role is to support this production through the provision of draught power. The contribution made by livestock to household income is negligible. Farmers believe livestock can become more important in terms of income generation if the main constraints to livestock production; insufficient feed, poor water quality and availability, disease, and ineffective extension services are ameliorated. The introduction of fodder crops and feed processing technologies will help to ease feed constraints through improving the amount of feed available and the quality of that feed. Improved farmer training on issues pertaining to livestock disease, agents of water contamination and water conservation methodologies will help to negate the impact of these constraints. However, to ensure that the necessary steps can be taken to alleviate production constraints, strengthening the capacity of extension services will be pivotal as it will only be with improved extension services that the interventions can be sustainability introduced.