

Assessment of livestock production and feed resources at Kerekicho, Angacha district, Ethiopia

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Background

Angacha district is one of the six woredas in Kambata Tambaro Zone, Southern Nations, Nationalities and Peoples' Region (SNNPR). It is located about 260 kms south west of Addis Ababa. Agriculture, mainly composed of crop production and animal husbandry, is the main livelihood of the population in the woreda. The agricultural practice employed in the area is traditional oxen-plough and hoe-culture practices. The main food crops grown in the woreda are wheat, tef, barley, maize, field peas and broad beans. Root crops, *enset*, and potato are also grown in the woreda. Among the perennial crops *enset* (false banana) plays an important role in the life of the people through its multiple uses as a source of food, fiber, animal fodder, construction material and to make mats for sleeping. Livestock are an integral part of the agricultural production system and play an important role in the economy of the woreda in general.

Kerekicho kebele is one of the 28 kebeles in Angacha Woreda. It is located at 07°21'47" East and 38°51'00" North. The area has an average elevation of 2280 masl. The main production system in the kebele is mixed crop livestock production system where *Enset* (*Ensete ventricosum*) is the major food for humans and feed for livestock (especially during the period of feed shortage in the dry season). *Enset* is mostly grown in backyards (Figure 1). It is estimated that close to 900 household heads are residing in the kebele.



Figure 1. Enset (*Ensete ventricosum*) farm

FEAST is a systematic method for assessing local feed resource availability and is used with a view to designing intervention strategies aimed at optimizing feed utilization (Duncan et al., 2012). It offers a systematic and rapid methodology to assess feed resources at site level with a view to developing a site-specific intervention strategy to improve and optimize feed supply, utilization and animal production through technical or organizational interventions. FEAST differs from conventional feed assessment approaches that focus on the feeds, their nutritive value, and ways to improve it. FEAST broadens this assessment to account for the importance of livestock in local livelihoods, the relative importance of feed problems locally, the local situation related to labour, input availability, credit, seasonality and markets. This tool was used to characterize the farming and livestock production system including feed resources and related aspects of farmers in Kerekicho, Angacha district of Southern Ethiopia.

The objective of the study was to provide an overview of farming system and identify the major livestock production challenges, opportunities and possible potential interventions with special emphasis on livestock feed and related aspects for the improvement of livestock production and productivity in Kerekicho kebele.

Sampling method

Discussions were made with the Africa RISING project, Lemo site coordinator, Kerekicho kebele administrators and development agents on the objective of the study and the farmers' selection criteria. Three sub-villages were purposively selected from the whole kebele based on the availability of irrigation practice. A total of 45 farmers (15 from each sub-village) were selected for focused group discussion. Female participation was encouraged.

Survey structure and format

A focus group discussion using participatory rural appraisal (PRA) methods and individual interviews were conducted to collect data for the study. Information on general farming, livestock production and management system and problems and opportunities for livestock production was collected from the PRA group discussion. All the farmers were selected based on wealth category (small, medium and large landholdings). Out of the 15 farmers selected in each sub-village, 9 farmers (6 male and 3 female) representing the three wealth categories were interviewed to collect quantitative data on livestock production, crop production, feed resource availability and livestock and livestock product marketing.

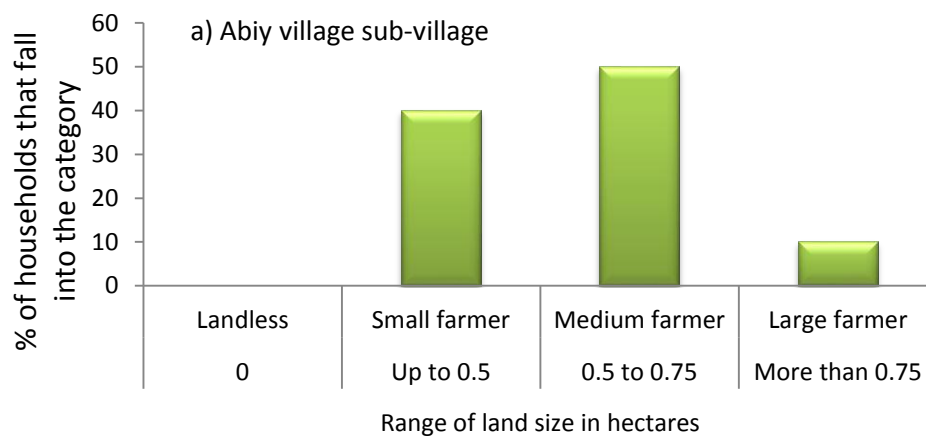
Data analysis

Narrative reports collected from group discussion were examined and reported. Individual interview results were analyzed using the FEAST excel template (www.ilri.org/feast).

Result and discussions

The total number of household heads in Abiy, Gutoso and Mehal Kerekicho sub-villages was reported to be 258, 84 and 295, respectively. The average family size per household for Abiy, Gutoso and Mehal Kerekicho sub-villages was 7, 8 and 7 people, respectively. About 36% of the household members migrate out the sub-villages searching for jobs in other areas. The average family size per household in the study sub-villages is large, which indicates that the area is densely populated. The farming system in Kerekicho kebele is classified as an *enset* based mixed crop-livestock production system. Land shortage is a serious problem as a result of high population density, thus farmers use land for more than one crop per year.

The average landholdings per households in the three study sub-villages are shown in Figure 2. According to the respondents, farm land size varies among the households. In Abiy and Mehal Kerekicho sub-villages, 50% of the households had medium size landholding. Only a small proportion (10%) of the households in Abiy sub-village had large landholdings. In Gutoso sub-village, the majority of household heads had large land sizes (more than 0.75 ha). However, a small proportion of household heads in this sub-village had small land sizes.



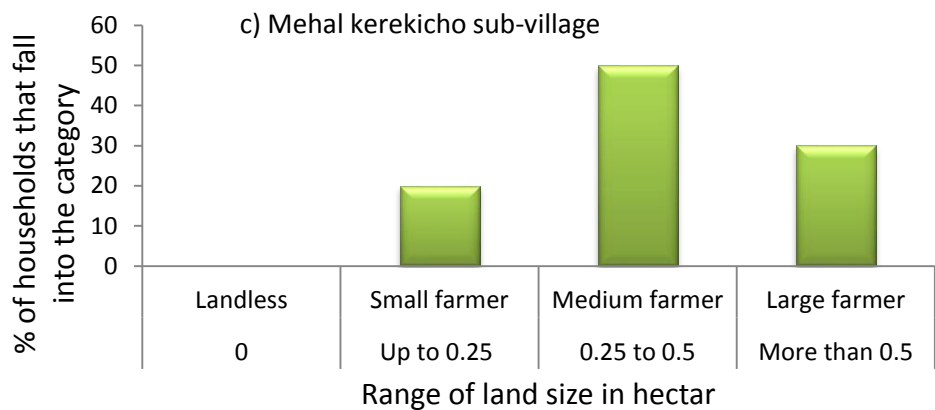
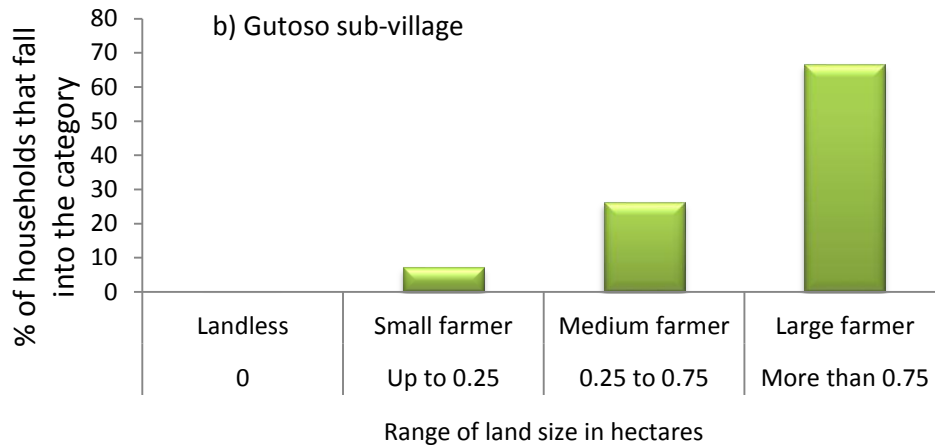


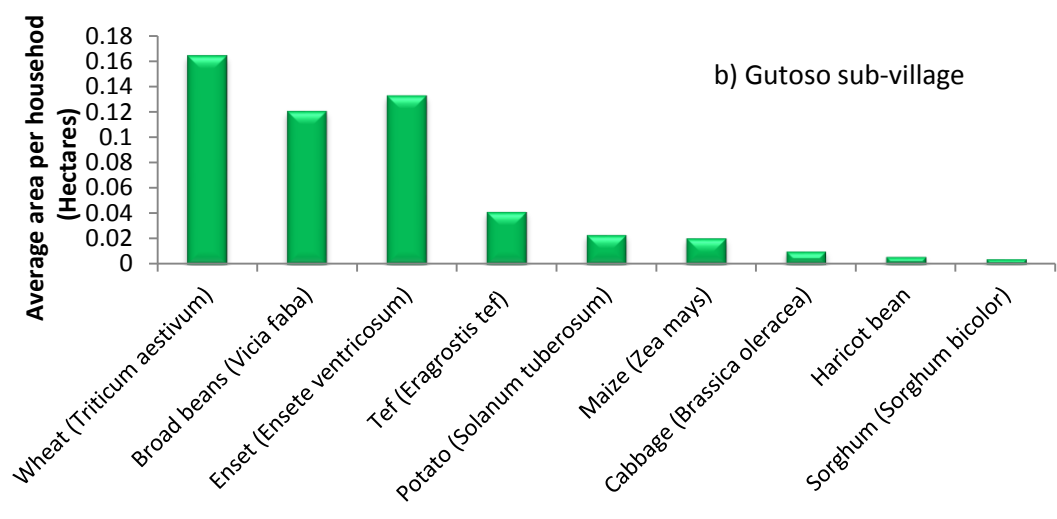
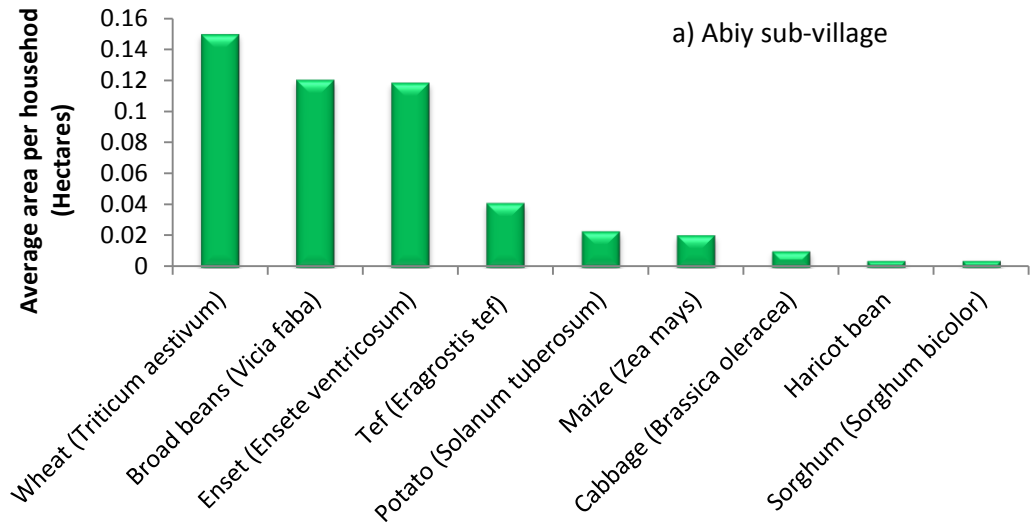
Figure 2. Land holding size of the households in study sub-villages

Crop production

Crop production is one of the major agricultural activities in the study sub-villages. Participants of the group discussion identified two major cropping seasons in the sub-villages. The two cropping seasons are locally known as '*Gilalo* and *Ojja*'. *Gilalo* season begins with January and extends to the end of May, and is the dry season. On the other hand *Ojja* begins in June and extends to the end of December. It is the season where heavy rainfall occurs. In *Gilalo* season the crops are grown with the help of small scale irrigation. Among the water sources, the predominant source of water for small scale irrigation is shallow well water. Moreover, rivers and springs are also used for a limited dry period of the year. Water can be lifted mostly using shallow wells with rope and washer pumps and in some cases a jerry can fastened to a rope. Water from such sources is distributed to irrigation fields with human labour using watering can and jerry cans. Even though springs and rivers run for only a short duration, water from these sources is conveyed to crop fields by traditional canals with natural gravity and plastic hoses. Major crops grown in the *Gilalo* season include potato, maize, haricot bean, barley, *enset*, sorghum, cabbages, carrots, sugarcane and coffee seedlings. Crops such as wheat, field pea, broad bean, tef, potato, barley, haricot bean, carrots, cabbages and beat roots are grown using rain water in *Ojja* season. Fallow land is not available in any of the sub-villages considered.

Wheat (*Triticum aestivum*) is the major crop grown by the farmers in the three sub-villages (Figure 3). *Enset* (*Ensete ventricosum*) and broad bean (*Vicia faba*) are the second and third most important

crops in the villages. Green *enset* is available throughout the year. Among vegetables, potatoes (*Solanum tuberosum*), cabbages (*Brassica oleracea*), peppers and carrots are the main cash crops used to generate income for the family in the three sub-villages. Maize (*Zea mays*), teff (*Eragrostis tef*) broad bean (*Vicia faba*), haricot bean (*Phaseolus vulgaris*) and sorghum (*Sorghum bicolor*) are produced for family consumption and extra produce is sold in the market.



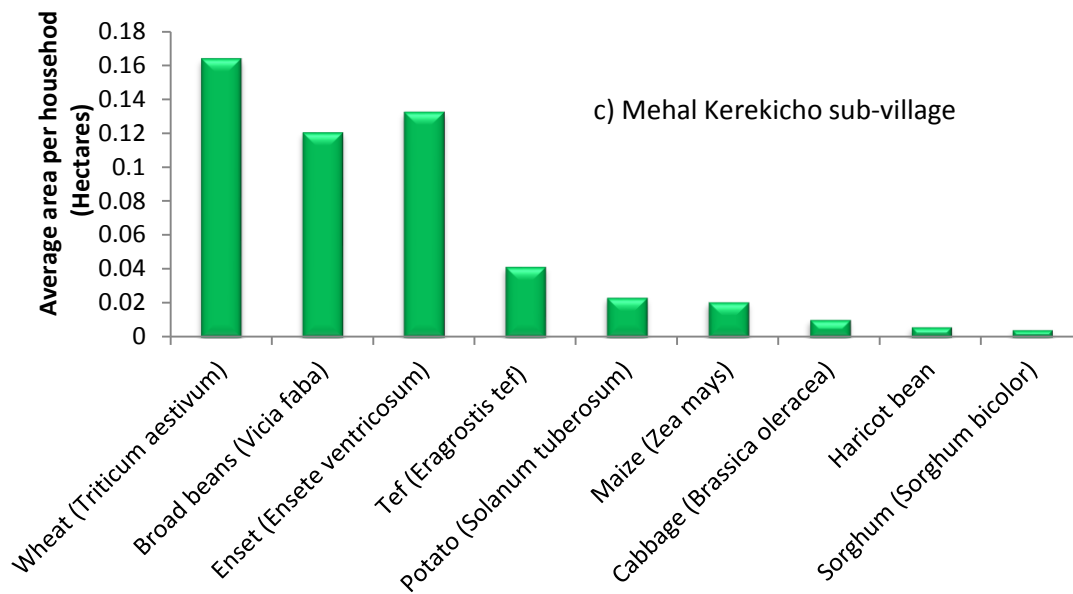


Figure 3. Major crops grown in the village

Livestock production and management

Livestock production in the kebele is a type of semi-intensive production system. Due to lack of grazing lands, livestock are most often tethered and kept in the backyard. However, there is also the practice of open grazing on farmlands for a limited period when crops are harvested. Cut-and-carry feeding is commonly practiced in the kebele during the wet season when farm lands are covered by crops. *Enset* leaves and crop residues represent the largest portion of animal feed during the entire dry period. It has been observed that small numbers of animals are kept by households in the three study sub-villages. On average 3 cattle and 6 chickens are kept by each household in the sub-villages. Except cattle and chickens, the average number for other species of livestock per household is small.

As a result of limited feed resource availability, most households usually possess a single ox. During land preparation periods, additional oxen are purchased to be paired with the existing ox. When the ploughing period is over, one of the oxen is sold to the market. In some instances farmers also have a tradition to pair their own single ox with the neighbor's or relative's ox for mutual benefit. In Gutoso and Mehal Kerekicho sub-villages, natural mating with local bulls is a commonly used breeding practice. Contrary to Gutoso and Mehal Kerekicho, some of the farmers in Abiy sub-village use improved bull service from bull owners. The service charge per insemination is estimated to be Ethiopian 20 birr. However respondents mentioned that bull service is a source of disease.

Respondents in the three sub-villages mentioned many purposes for keeping livestock such as milk and meat, source of cash (from sale of animals and their products), source of manure, source of draught power (traction, threshing, and transport) and replacement stock. In most cases, livestock are housed at night in separate partitions within the living home. There are no separate houses for livestock. Lack of awareness on livestock housing, fear of theft, predator risk and material shortage were some of the reasons that farmers mentioned as not having separate livestock barns. The floor of the barn in all sub-villages was constructed of wood.

Average livestock holding per household for the three study sub- villages is shown in Figure 4. Improved dairy cattle are kept by the households though the number of crossbred animals varied among the study sub-villages. Donkeys are also important draught animals in transporting products from place to place. Small numbers of scavenging chickens are also raised by the households for egg,

meat and income purposes. The milk yield produced in Abiy, Gutoso and Mehal Kerekicho sub-villages is 2.1, 1.7 and 1.3 liters/day, respectively. The whole milk produced in the study sub-villages is retained at home for family consumption and the remaining amount is further processed into butter and *ayib* for market.

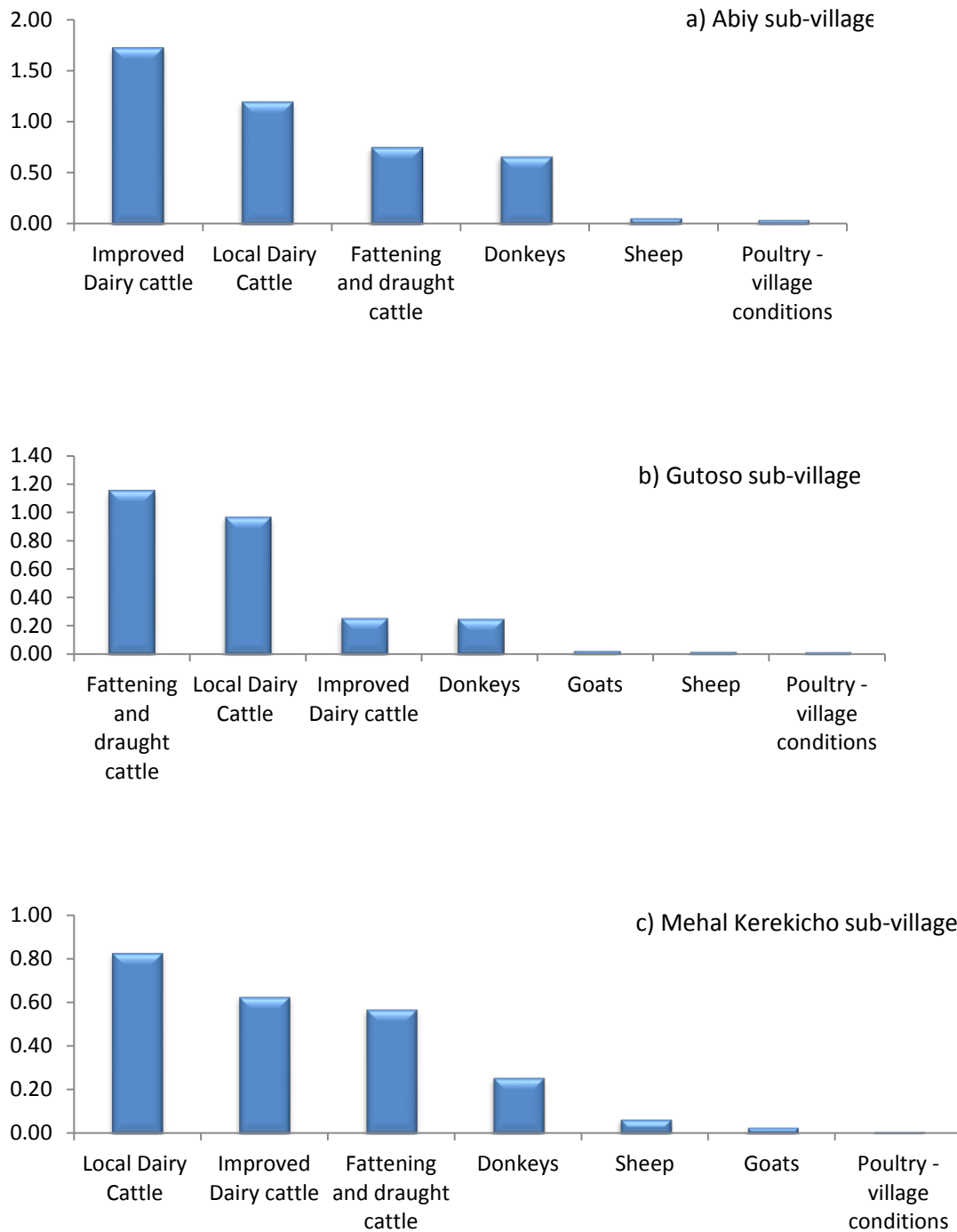


Figure 4. Average livestock holdings per household in Tropical Livestock Unit (TLU) in the study sub-villages

Fodder crops

Farmers in the group discussion listed the names of improved forage crops. However, establishment and utilization of improved forages as livestock feed in the sub-villages is hardly known. Most of the farmers have grown local *Desho* grass at the backyards (Figure 5). Some of the farmers have experience of selling the root splits of *Desho* grass to some NGOs.

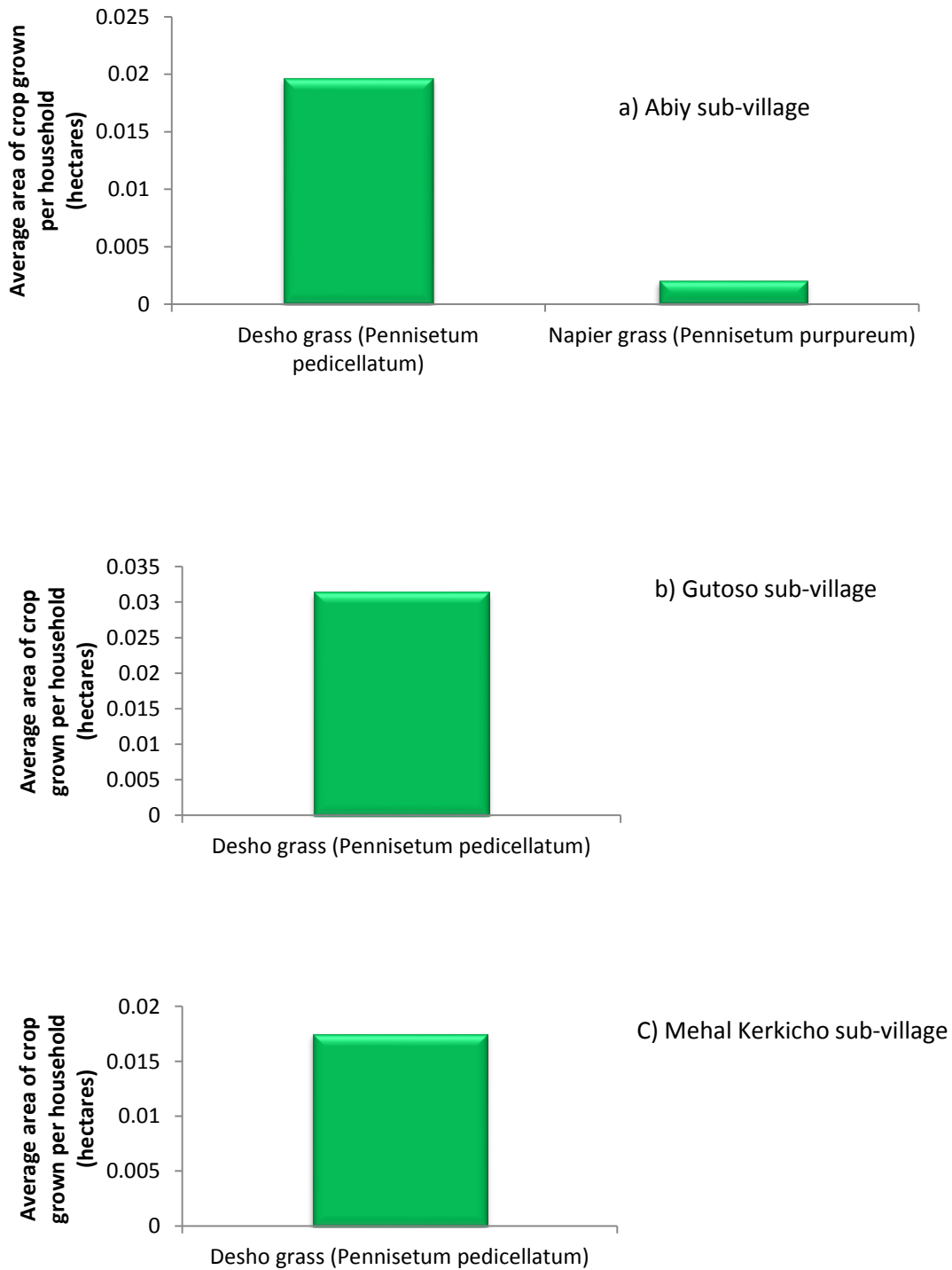


Figure 5. Fodder crops grown in the study sub-villages

Agricultural inputs

Agricultural inputs such as improved seed, fertilizer, irrigation equipment and animal health drugs are not readily available in the study sub-villages. Among the farm implements (hoes, sickle and plowshares) are available in the local market. The availability of fertilizer is seasonal. Available inputs are supplied by traders, Ambericho Union and Omo-Micro Finance Institution. These suppliers are found at Angacha town where road is accessible. On average it takes an hour round trip on foot.

Credit services

Except for fertilizer, credit services to boost both crop and livestock production is not easily available in all the study sub-villages. Omo-Microfinance is the only responsible institution for credit service with regard to fertilizer and other available inputs. However, the strong binding rules and regulations (e.g. one needs to save money in the credit and savings institution to get credit) and limited capacity of the service (small amount of money given - equivalent to the amount saved, few farmers can be given loans at any one time) are major limitations to farmers obtaining credit.

Animal health and artificial insemination services

Livestock disease is one of the bottlenecks affecting the production and productivity of livestock in the study sub-villages. Public based veterinary services are available at Angacha town. During disease occurrence farmers do make telephone calls to animal health professionals for any kind of assistance. Following the call, the health experts need to travel to the area with motor bike. Farmers are asked to pay Ethiopian birr 50 birr per treatment per animal. This charge does not include expense for fuel (which is estimated to be Ethiopian birr 40). As a lump sum the farmer is expected to pay a total of Ethiopian birr 90. In Abiy sub-village farmers are using improved bull service to breed their cows. AI service is available in both Abiy and Mehal Kerekicho sub-villages. However group participants reported that the success rate and coverage of AI is low. The service charge per insemination per cow is estimated as Ethiopian birr 5.

Labour availability

According to the discussion made with the participants, labour is readily available when needed. Since land is limited in relation to high population density, many people migrate out to other areas in search of jobs. Almost 35% of the families per household are migrating every year. Farm activities such as land preparation, planting, weeding, harvesting and grain collection are undertaken by family labour and individual farmers form a group locally known as 'Gejja'.

Household income sources

Farmers sell food crops, cash crops, livestock and their products and other off-farm activities to get income. The contribution of different income sources is indicated in Figure 6 below. Remittance from relatives abroad is another source of income for the family.

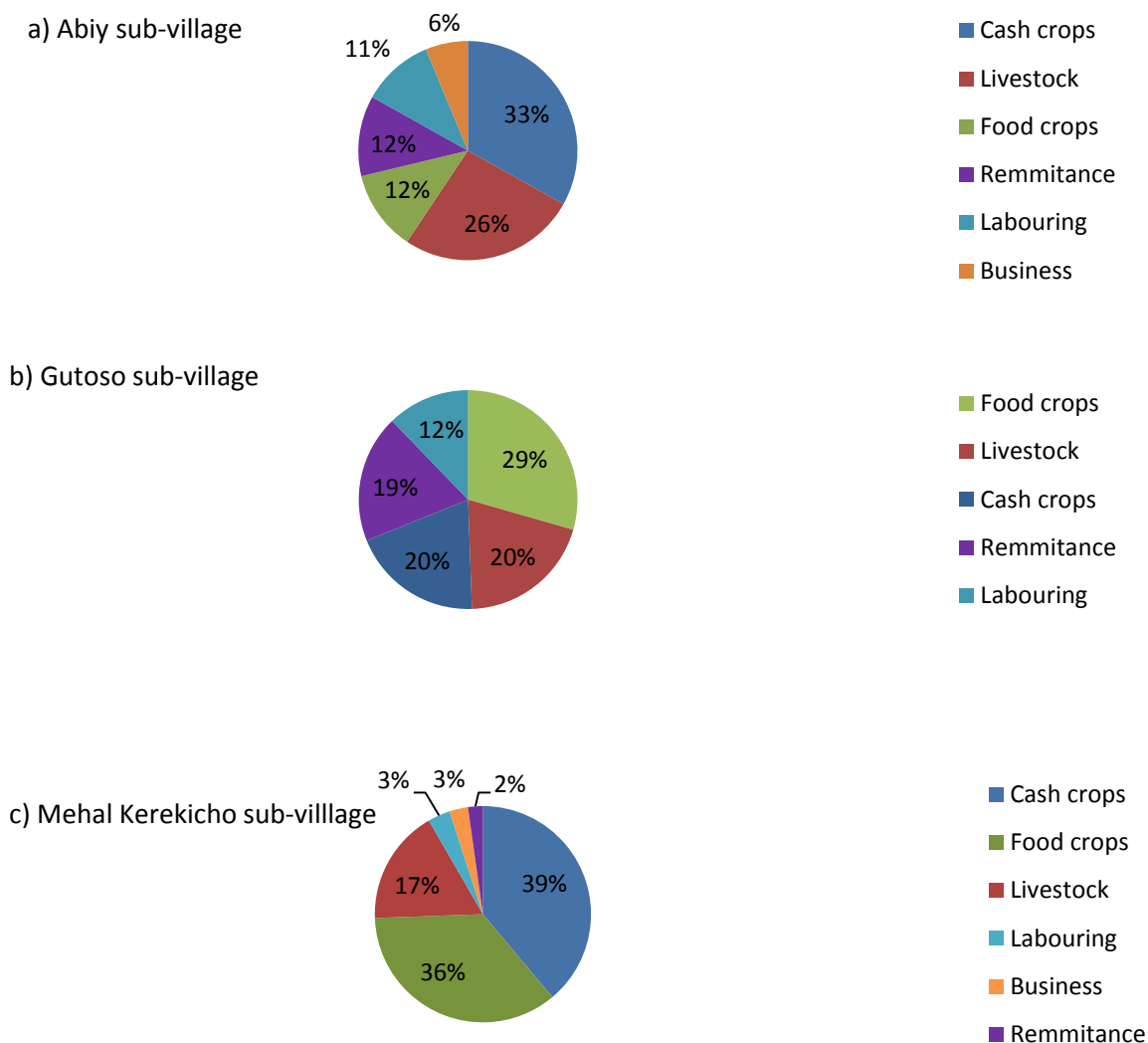


Figure 6. Contribution of income sources to livelihood of households (as percentage) in the study sub-villages

Livestock feed resource availability

The total proportion of supplementary feeds purchased per annum in the study sub-villages is indicated in Figure 7. Wheat bran is the only supplementary feed purchased by the farmers. It is obtained from the flour factories established in the nearby towns. However, protein supplement feeds such as noug seedcake, cotton seedcake and linseed cakes are not available in the surrounding market. A few farmers purchase teff straw, sugarcane tops and maize stover in Abeyi sub-village.

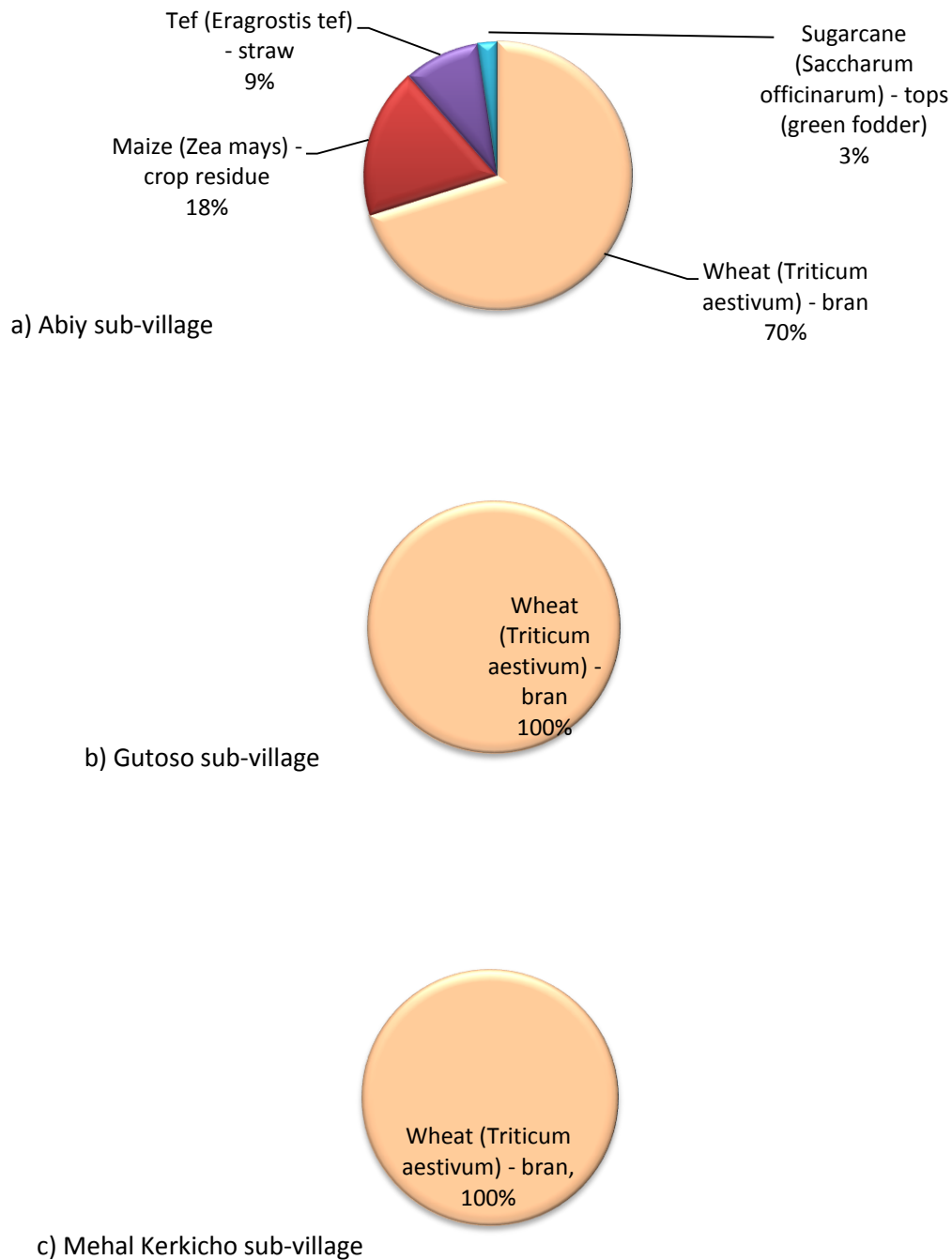


Figure 7. Quantity of concentrate feeds purchased over a 12 month period in the study sub-villages

The contribution of available feed resources to the total dry matter (DM), metabolizable energy (ME) and crude protein (CP) in the study sub-villages is shown in Figures 8, 9 and 10, respectively. In the study sub-villages naturally occurring and collected fodder contributed for the largest portion of the total dry matter, metabolizable energy and crude protein. Crop residues are also the second largest contributor for DM, ME and CP content of the total diet in the study sub-villages.

The major livestock feed resources in the area are naturally occurring and collected fodders and crop residues. Availability of these feeds varies across different months of the year (Figure 11). During the rainy season, naturally occurring and collected grasses are the most important feed resources in the study sub-villages. Availability of naturally occurring and collected fodders largely

relies on rainfall and it is adequately available from the onset to the end of the main rainy season (June to October). However, crop residues supplemented with *enset* leaves are the main livestock feed sources in the dry season of the year. They are the main feed resources available to animals from November to June, a period of critical feed shortage. Feed is not in surplus at any time in the study sub-villages. Although, crop residues are an important feed resource in the dry season, except chopping for maize stover all farmers provide the rest of the straw types to their animals without any physical or chemical treatment such as chopping and application of urea.

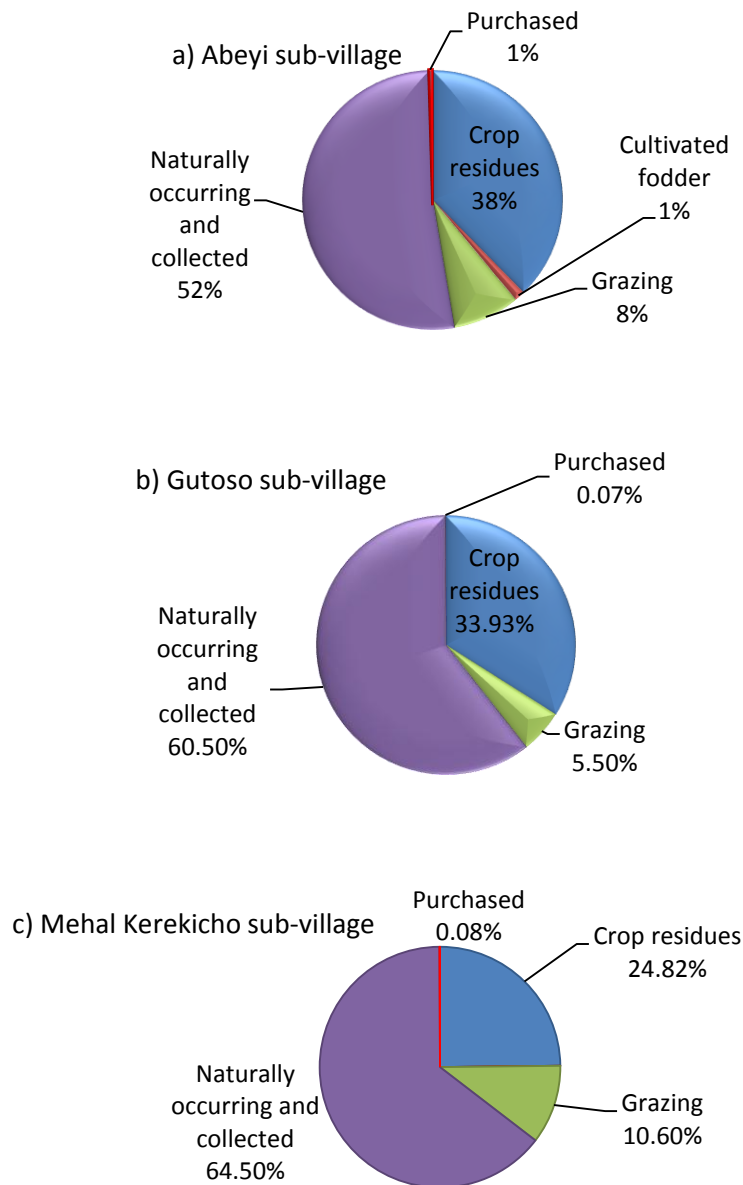
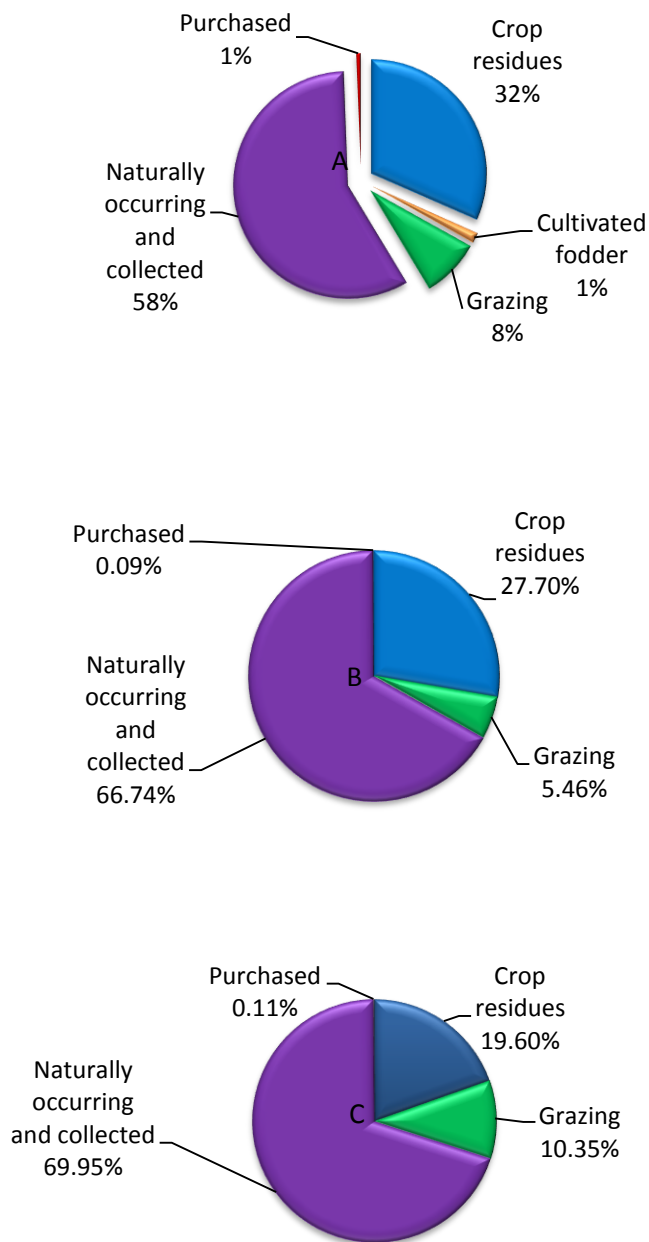


Figure 8. Contribution of different feeds to the dry matter in the study sub-villages



A = Abeyi sub-village
 B = Gutoso sub-village
 C = Mehal Kerekicho

Figure 9. Contribution of different feeds to the metabolizable energy in the study sub-villages

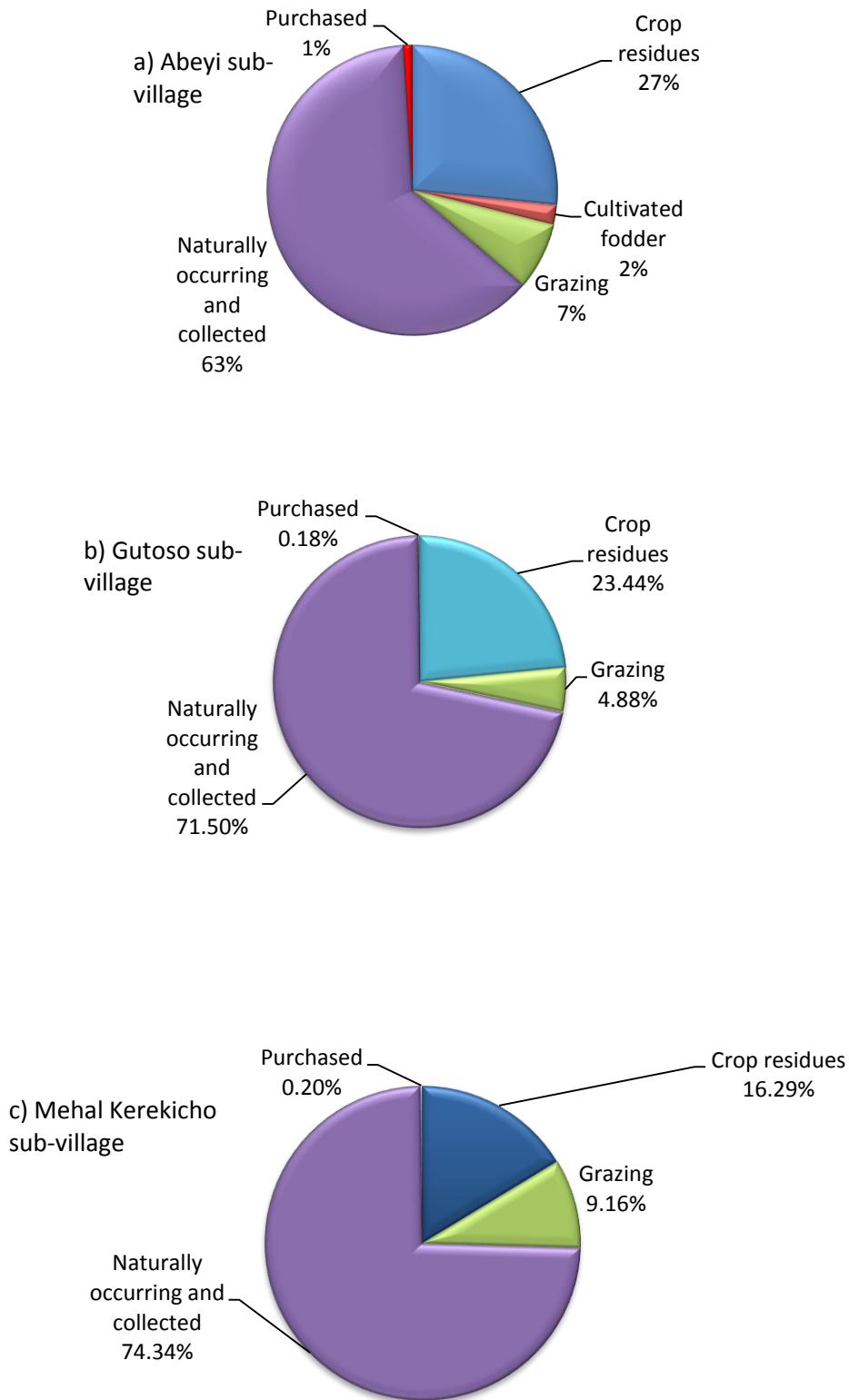


Figure 10. Contribution of different feeds to the crude protein in the study sub-villages

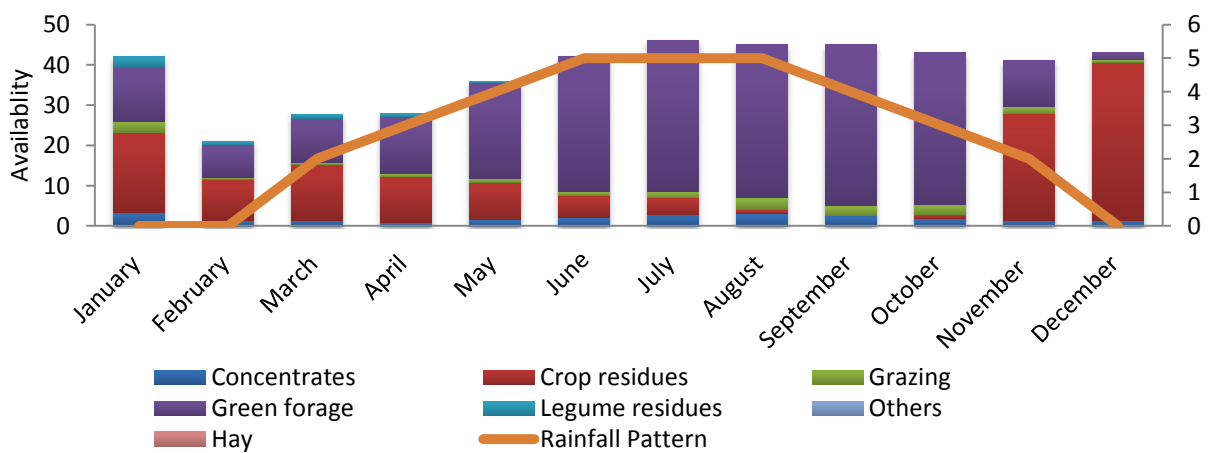
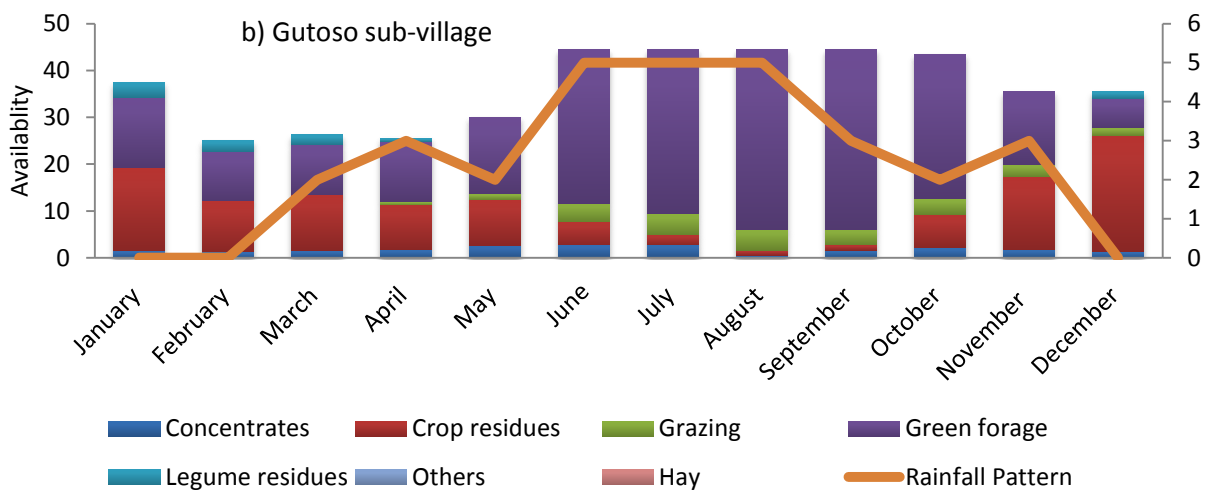
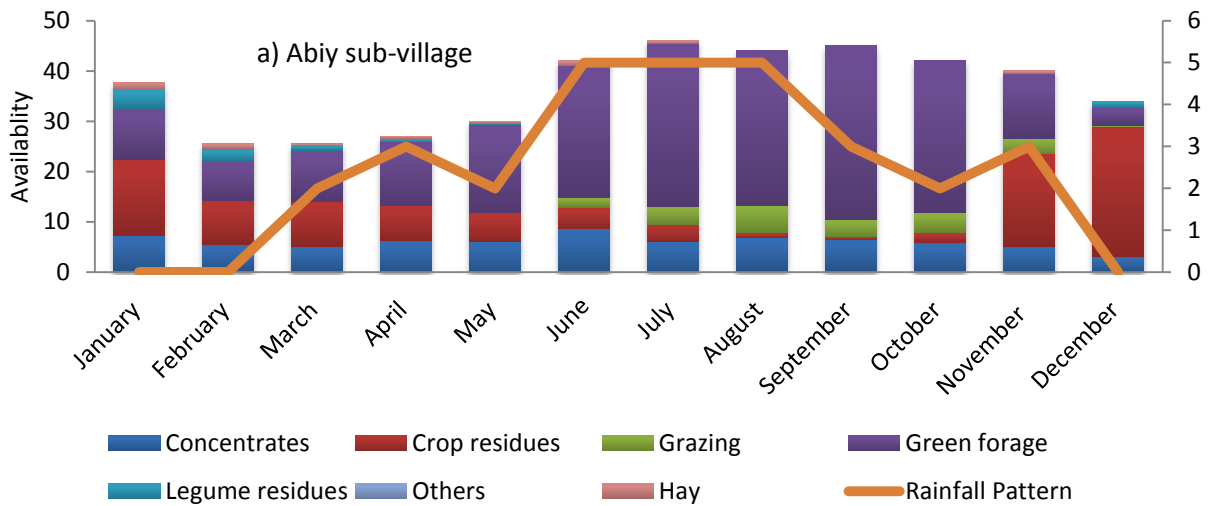


Figure 11. The composition of the livestock feed throughout the year in relation to rainfall pattern

Main livestock production constraints

Based on pair wise ranking, major problems were ranked by the respondents in order of their importance. The farmers who took part in the PRA discussion also suggested some solutions to solve the problems in their respective sub-villages. Shortage of livestock feed was identified as a major problem in Abiy sub-village (Tables 1). On the other hand in Gutoso and Mehal Kerekicho sub-villages, the group participants identified knowledge gap on livestock management and husbandry as a main problem (Table 2 and 3). The other problems identified in Abiy sub-village were knowledge gap on livestock husbandry and management, lack of improved cattle breeds and limited animal health services (Table 1). Livestock feed shortage, lack of improved dairy cattle breed and limited animal health services were other problems identified by the participants from Gutoso and Mehal Kerekicho sub-villages (Table 2 and 3).

Table 1. Major livestock production problems identified and solutions suggested by PRA participants in Abiy sub-village

Problems	Problems listed	Suggested solutions
1	Livestock feed shortage	<ul style="list-style-type: none"> • Establish improved forages at backyards and multiply them • Training on crop residue treatment techniques
2	Knowledge gap on livestock husbandry and management	<ul style="list-style-type: none"> • Training and awareness creation by concerned expertise • Experience sharing on best practices
3	Lack of improved dairy cattle breeds	<ul style="list-style-type: none"> • Improve artificial Insemination service coverage • Improved bull and semen services • Select local cattle breeds and cross them
4	Limited animal health services	<ul style="list-style-type: none"> • Assigning animal health workers at the kebele level

Table 2. Major livestock production problems identified and solutions suggested by PRA participants in Gutoso sub-village.

Problems	Problems listed	Suggested solutions
1	Limited knowledge/awareness on livestock management and husbandry	<ul style="list-style-type: none"> • Proper extension service and training on livestock husbandry, management and production • Experience sharing on best practices
2	Livestock feed shortage	<ul style="list-style-type: none"> • Allocate land to establish improved forages at backyards. • Improve crop residue storage. • Training on crop residue treatment and utilization
3	Lack of improved dairy cattle breed	<ul style="list-style-type: none"> • Select local cows and cross them with exotic semen • To use community based bull service • Allocate AI technician in the kebele
4	Limited animal health services	<ul style="list-style-type: none"> • Make services available at <i>kebele</i> level • Training for farmers to provide community based animal health service

Table 3. Major livestock production problems identified and solutions suggested by PRA participants in Mehal Kerekicho sub-village

Problems	Problems listed	Suggested solutions
1	Limited knowledge/awareness on cattle management and husbandry	<ul style="list-style-type: none"> • Proper extension service and training on livestock husbandry, management and production • Experience sharing on best practices
2	Livestock feed shortage	<ul style="list-style-type: none"> • Improve utilization of crop residue • Training on establishment of improved forages • To provide credit service to purchase concentrate feeds
3	Lack of genetically improved dairy cattle	<ul style="list-style-type: none"> • Improve bull service • Promote AI services and improve availability
4	Lack of animal health services	<ul style="list-style-type: none"> • Assign animal health workers in the kebele

Conclusions

Livestock are prominent components of the farming system in Kerekicho kebele. Farmers realize the benefits of keeping livestock although the numbers and production levels of livestock are decreasing due to feed shortage, lack of improved livestock breeds, limited animal health and knowledge gaps on management and husbandry. The existing extension systems with regard to the livestock system need to be strengthened to bring change on livestock production improvement.

In order to enhance livestock production and productivity in the kebele, the following issues need to be addressed.

- Introduce improved forages and link to the existing irrigation practice
- Support farmers with training on how to establish and utilize improved forages in the area
- Provide training on the alternative means of improving the quality of existing crop residues
- The existing practice of feeding *enset* leaves to livestock need to be further investigated to come up with appropriate utilization
- High demand for dairy and dairy products in the area need to be addressed through selection and crossing of indigenous cattle with exotic genotype.
- Training and awareness on overall improved management and husbandry practices

Reference

Duncan, A.J., York, L., Lukuyu, B., Samaddar, A. and Stúir, W. 2012. Feed Assessment Tool (FEAST). www.ilri.org/feast.