

FY 2013 Food For Progress Feed Enhancement for Ethiopian Development Phase II (FEED II) Project

Baseline Report

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ACRONYMS

CSA	Central Statistical Agency
DAs	Development Agents
GDP	gross domestic product
ESAP	Ethiopian Society of Animal Production
FEED II	Feed Enhancement for Ethiopian Development, Phase II
FGDs	Focus Group Discussions
FTC	Farmers Training Center
HH	Household
HRW	Hard red winter
M4	membership, marketing, money and management
M&E	Monitoring and Evaluation
MOA	Ministry of Agriculture
PMP	Performance Monitoring Plan
SNNPR	Southern Nation and Nationalities People Region
SPSS	Statistical Package for Social Sciences
USDA	United States Department of Agriculture

EXECUTIVE SUMMARY

The goal of the Feed Enhancement for Ethiopian Development, Phase II (FEED II) Project is to increase the incomes of Ethiopian smallholder livestock producers by improving access to and use of consistent, affordable, high quality animal feed that can support greater livestock productivity and efficiency. This goal will be achieved by focusing on two strategic objectives: (1) increasing the productivity of livestock and poultry in Ethiopia by developing the animal feed sector, and (2) expanding trade of agricultural products in the livestock and poultry sector by introducing and expanding feedlot (fattening), poultry and dairy enterprises. The project is funded by the U.S. Department of Agriculture (USDA) and implemented by ACIDI/VOCA in four regional states of Ethiopia – Amhara, Oromia, SNNPR and Tigray. Following the signature of the cooperative agreement between USDA and ACIDI/VOCA in September, 2013, FEED II designed and conducted baseline study covering all project areas in the four regions. The main objective of the study was to collect information and baseline values on outcome indicators that will enable the project to measure its progress towards project expected results and the impacts of project interventions as the project progresses. These baseline values also will be used to finalize the performance monitoring plan (PMP) developed for the project. In addition, the information obtained from this study will be used to inform the design and planning of FEED II interventions.

Baseline information was collected from livestock holding households, cooperatives and government officials in targeted areas of the project regions. The study employed both quantitative and qualitative information collection tools. A structured household questionnaire and checklist that guides the discussion with communities was developed for the quantitative survey. The sample size was a total of 462 households per region or 1,848 overall. Data enumerators were recruited from the surveyed woredas' agricultural offices, trained on the questionnaire and interviewing techniques and supervised by project staff in the field. Qualitative information was collected through focus group discussions. The field work took about two weeks per region.

Key examples of the findings are that overall 79.4 percent of interviewed households owned dairy cows in the 12 months preceding the survey. Fifty-nine percent owned only local dairy cows, about 13 percent owned only crossbred dairy cows while about 8 percent owned both types. The average local dairy cows' productivity is less than 1 liter/cow/day while the average crossbred cow produces almost 4/liters/day. Dairy cow feed is mainly crop residues and some green forage. Only 4 percent of respondents reported that they have fed factory formulated and mixed feed to their dairy cows. Almost 13 percent of respondents received training on improved dairy cow management.

Animal fattening has been practiced by 43 percent of respondents in the last year, but they only fattened an average of 2.1, 3.8 and 5.5 cattle, goats and sheep, respectively. Only 6 percent of respondents used concentrated feeds for fattening animals, and only about 2 percent received training on fattening management.

Sixty-five percent of respondents own chickens, with average holdings of 5.75 and 3.1 for local and improved chickens, respectively. Sixty-three percent of households owned local and 22 percent owned improved egg laying hens. The average egg production for local and improved hens per year

was 64.4 and 187.3, respectively. The types of shelter for hens is mainly unconfined and the feeding system is almost exclusively scavenging supplemented by home grains.

The study also shows that 30 percent of respondents cultivated forage in the last 12 months. Most of them used improved forage planting materials sourced from government, farmers' exchanges, purchases from private vendors and NGOs. Eighteen percent of respondents said that they have access to factory formulated and mixed feed distribution center within an 18-kilometer radius of their farms. The current income from livestock through fattening, dairy products, and poultry is an average of just over 9,744 birr (\$500)/year/household.

These and many other data figures in the report suggest that most FEED II baseline values are quite low. However, the study found no evidence to suggest that 15 percent increases in key indicators are unachievable, but proposes refinements of the following four outcome indicators:

1. Respondents apparently considered any “feeding” of animals that would ultimately be sold for meat qualified as “fattening.” Fattening for the commercial market, whether by smallholders or larger feedlots, typically involves the provision of high energy feeds for a period of 60 – 120 days, with 90 days being a common target. As a result, the definition of “fattened cattle” that should be used for the purpose of benchmarking this indicator is “cattle provided feeds high in energy for a period of 60 – 120 days.” The benchmark value would be expressed as “number of cattle fattened/year/household.
2. With respect to poultry, the survey confirmed expectations that holdings in the project’s target population consist largely of local birds. Improved breeds, while growing, are still only about one quarter of the total. As a result, growth in smallholder poultry production is likely to depend on local birds, too; not just improved birds. In light of this fact and upon reconsideration, it seems illogical to focus Outcome 1/Indicator 2 only on improved poultry. The indicator has, thus, been revised to reflect all poultry, regardless of breed type (indigenous vs. improved) or class (layer vs. broiler, etc.). The premise is that any increase in poultry production per household is exactly that, an increase in poultry production. This revision captures better the intent of this indicator.
3. During the survey it was found that a significant number of households with milk cows sell milk products such as butter and cheese instead of milk. As a result, to better capture the revenue generated by these products Outcome 2/Indicator 1 has been revised to include “milk products” in the list of marketed outputs.
4. As for Outcome 2/Indicator 2, for clarification purposes it should be noted that the focus is on commercial enterprises, whether cooperative/union or other group based, which the FEED II project helped establish. Livestock, poultry and forage activities engaged in for profit by participating smallholder farmers will also be monitored but the indicator refers to the commercial enterprises. Moreover, return on investment is not a change from some previous value. Rather, it is a value determined for a given period during the project.

I. Introduction

The Feed Enhancement for Ethiopian Development II (FEED II) Project is a three-year program funded by the United States Department of Agricultural (USDA) and implemented by ACDI/VOCA. The cooperative agreement between USDA and ACDI/VOCA under USDA's Food for Progress Program provides for monetization of 40,000 MT of USDA-provided HRW (hard red winter) wheat to provide most of the funding for FEED II.

Ethiopia has the largest livestock population in Africa with an estimated 54 million cattle, 25.4 million sheep, 24.1 million goats, and 50.4 million poultry (CSA, 2012). Livestock are sources of food, draught power, fertilizer and fuel, income, and wealth accumulation. Moreover, the livestock subsector contributes 12-16 percent of the country's GDP and 16 percent of foreign earnings (Ethiopian Ministry of Agriculture (MOA), January 2013). Livestock play an important role in the livelihoods of 60-70 percent of the population, particularly in the highlands of Ethiopia where numbers and types of livestock are strong indicators of family wealth. Furthermore, they are the main form of investment, cash on hand and provide owners with purchasing power (ESAP, 2001).

Even though Ethiopia has the largest livestock population and livestock is the major livelihood activity for a majority of the population, per capita production in the livestock sector has been declining for many years. Inadequate and poor quality feed resources are one of the major challenges facing the livestock sector (MOA, January 2013). FEED II's goal is to address this challenge and support Ethiopian smallholders in developing the animal feed subsector.

The project will be implemented in four regional states of Ethiopia: Amhara, Oromia, SNNPR, and Tigray, and will partner with livestock departments, agricultural cooperative unions, and their member cooperatives as well as government administrative authorities. The FEED II cooperative agreement was signed in September 2013, but field implementation began in late March 2014, after normal startup activities (e.g. staffing and monetization) and a longer than anticipated approval process by the regional governments of required regional agreements. Before the start of project implementation, a baseline study was launched in order to establish reference point values that project achievements will be measured against to evaluate progress and impact of FEED II supported activities. The baseline also will be used to enhance understanding of the context in relation to FEED II activities in the project areas.

I.1 FEED II Results Framework

The overall goal of FEED II is to increase the incomes of of Ethiopian smallholder livestock producers by improving access to and use of consistent, affordable, high quality animal feed that can support greater livestock productivity and efficiency. This long-term goal will be achieved by focusing on two strategic objectives: (1) increasing the productivity of livestock and poultry in Ethiopia by developing the animal feed sector, and (2) expanding trade of agricultural products in

the livestock and poultry sector by introducing and expanding feedlot (fattening), poultry and dairy enterprises. The four intermediate result (IRs) and five outputs are focused on achievable results.

The data collected during this baseline study responds to FEED II's conceptual framework (Figure 1) that assumes activities listed in the white boxes will contribute to achievement of the corresponding outputs and the outputs will contribute to realizing the intermediate results and ultimately the FEED II strategic objectives of; "increased agricultural productivity" and "expanded trade of agricultural products". This relationship between these variables was proven to be effective during the FEED I project, which had the same goal, objectives and similar activities.

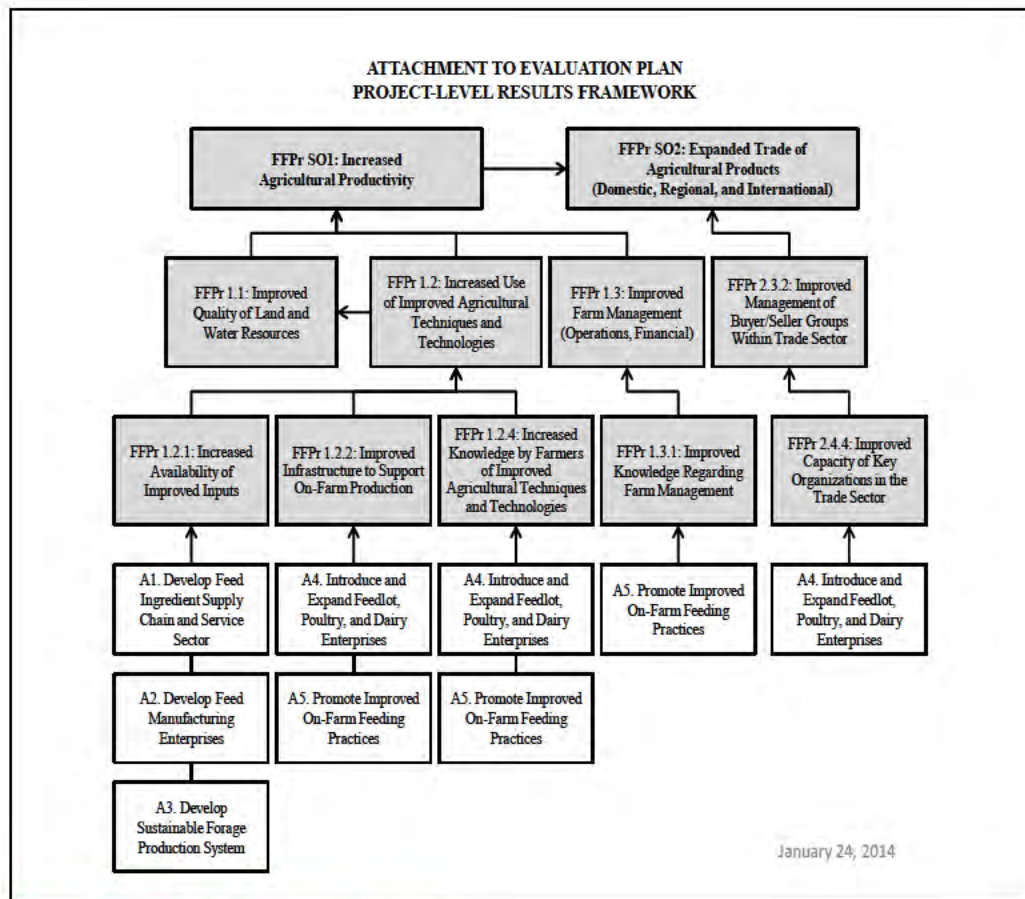


Figure 1: FEED II Project Conceptual Framework

Goal: Increase the incomes of Ethiopian smallholder livestock producers by improving access to and use of consistent, affordable, high quality animal feed that can support greater livestock productivity and efficiency.

I.2 Implementation Modality and Project Sites

The FEED II Project will be implemented mainly through cooperative unions, their respective primary level cooperatives and cooperative members. Prior to the baseline survey, a thorough assessment of potential cooperative unions was carried out to identify unions that could implement project activities with the help of technical support and grants. The assessment employed field visits and site observations using a pre-determined checklist and a membership, marketing, money and management (M4) assessment tool developed by ACIDI/VOCA with the aim of identifying relevant unions. Some of the selection criteria in the checklist were:

- **Feed market potential** – population of crossbred cattle with the accepted threshold at greater than 400 per union operational area;
- **Infrastructure** – having adequate working space, access to good roads for ingredients and finished products as well as access to three-phase electrical power;
- **Existence of feed ingredient retailers** – at least three prospective retailers in the area;
- **Concept note/proposal** – alignment with FEED II's program objectives, acceptable level of detail as well as proposed leverage of resources; and
- **Government recommendation** – extent to which local government supported the candidacy of the union under discussion to participate in project activities.

A total of 36 unions were identified for assessment – 8 from Amhara, 11 from Oromia, 8 from SNNPR and 9 from Tigray. Ultimately, 3 unions from each region were selected to participate in all 5 FEED II project activities while a fourth was selected to participate in 4 of the 5 activities (excluding Activity 2, feed manufacturing).

Following the selection of unions, 29 new and 10 FEED I union affiliated woredas (districts) were selected as FEED II implementation sites (10 from SNNPR, 10 from Oromia, 9 from Amhara and 10 from Tigray). Table 1 below presents the list of unions and corresponding targeted woredas by region.

I: Table I.1. List of selected unions and woredas by region.

Regions	FEED II Unions	FEED I Unions	Zones	Woredas
SNNP	Ambericho		Kenbata Tenbaro	Damboya & Kedida Gamela
	Melik		Silte	Selti & Dalocha
	Gamo Gofa Farmers' Veg. & Fruit Market.		Gamo Gofa	Chencha & Arbaminch Zuria
	Walta		Guraghe	Sodo Bue
		Sidama Elto	Sidama	Wondo Genet
		Licha Hadiya	Hadiya	Misha
		Domota Wolayita	Wolayita	Damota Gale
Oromia	Liben		Southwest Shewa	Becho & Woliso
	Galema		Arsi	Tiyo & Huruta
	Gibe Didesa		East Wellega	Guto Gida & Jima Arjo
	Biftu Salale		North Shewa	Jida & Kuyu
		Wonji	East Shewa	Dera
		Ambo	West Shewa	Dendi
		Selale	Finfine	No woreda targeted; activities union based
Amhara	Admas		Awi	Guagussa & Dangela
	Gozamin		East Gojjam	Machekel & Gozamin
	Megenagna		South Gonder	Libo Kemekem & Farta
	Damot		West Gojjam	Dembecha & Jabi
		Merkeb	West Gojjam	Fogera
		Wodera	North Shewa	No woreda targeted; activities union based
		Erikum	South Wollo	No woreda targeted; activities union based
Tigray	Setit Humera MCU		Western	Kafta-humera
	Geter Adwa MCU		Central	Adwa & Laelay Mychew
	Debre Asa MCU		Central	Kola-Temben
			Southeast	Dega-Temben
	Shewit		North East	Tahtay koraro
		Bokra	Southern	Raya Zebo & Ofla
		Wolwalo	Eastern	Sasie-tседа Amba
		Enderta	Eastern	Keleta Awlalo

The intensity of FEED II implementation in woredas where FEED I was active and in new FEED II project woredas will not be the same. FEED II unions will be fully involved in the project in 29 woredas while unions supported during FEED I will receive technical and follow-up support in 10 woredas.

However, both were included in the baseline survey to gather comprehensive information related to planned project activities. The total number of individual members of FEED II unions is 617,505, of which 15 percent are women.

In these woredas, 4 to 5 kebeles (sub-districts) have been identified as project sites. Similarly, project kebeles have been identified based on access to market, infrastructure (road and electricity) and cross-bred livestock population. Most of the project sites have relatively high crossbred livestock populations, and are close to main towns and on roads. Table-1.2, below shows the numbers of project woredas and kebeles by region.

2: Table 1.2. Number of project woredas and kebeles by region.

Regions	No. Project Woredas	No. of Project Kebeles
Amhara	9	36 (4 kebeles/woreda)
Oromia	10	50 (5 kebeles/woreda)
SNNPR	10	50 (5 kebeles/woreda)
Tigray	10	50 (5 kebeles/woreda)
Total	39	186

Both globally and in Ethiopia specifically, ACIDI/VOCA has a great deal of experience building and working with cooperatives; FEED II will mainly work through the coops and their unions. In the project woredas, almost all kebeles have some type of cooperatives, either for livestock (dairy and/or fattening) or multi-purpose, and the majority of livestock producers in the kebeles are members of one and/or the other. During selection of kebeles for project implementation, it was anticipated that about 200 cooperatives would be covered by the project (one or two cooperatives per kebele). Thus cooperatives are primary beneficiaries of the project through either technical and/or grant support.

II. Baseline Study Methodology

2.1 Baseline Study Objectives and Rationale

The evaluation plan developed during the design of FEED II highlighted the fact that the baseline survey is the first critical step in establishing benchmarks for project performance measures followed by regular monitoring, mid-term and final evaluations to enable measurement of the progress and impact of project interventions. Moreover, the baseline survey helps the project team and stakeholders understand conditions as they are at the beginning of the project, so that the project can monitor, measure, document, and share changes as the project progresses, while management is undertaking the necessary modifications to project activities and implementation approaches to ensure the greatest project success. It also will be used to finalize the performance-monitoring plan (PMP) developed for the project. Therefore, the baseline survey was conducted for the following main purposes:

Collect both quantitative and qualitative data for outcome indicators identified in the results framework and establish baseline values for these outcome indicators;

Assess and understand the prevailing conditions in the project target areas and among beneficiaries; and Finalize the performance monitoring plan (PMP) by establishing baseline values for project indicators before the start of activities.

The baseline survey provides key basic information related to project activity areas that will inform management, so that project activities can be properly planned, managed and implemented.

2.2 Study Design

The survey was a cross-sectional survey in nature and designed to provide livestock, household and cooperative level information related to project indicators. Households with livestock and cooperatives in the project regions are the target groups from which baseline information was collected. Regions are the geographic domains of the survey and treated independently.

2.3 Sample Size Determination

The sample size was determined based on Cochran's general formula (J.E. Bartlett, et al, 2001), using a 70 percent adoption rate. Including a projected 10 percent non-response rate and 1.3 design effect, a total of 462 households were determined to be the needed sample size for each region (Annex I). The technical team decided that the survey would cover eight woredas in each region due to the nature of those woredas. Woredas varied greatly in terms of the crossbred livestock populations contained therein, availability of feed, and access to infrastructure and markets. Therefore, a larger proportion of the total project woredas were included in the sample than were originally thought necessary. The 462 sample households were allocated equally between the eight woredas in each region.

Furthermore, in each selected woreda, four kebeles already selected for project intervention were considered in the baseline. This number was decided due to the small number of project kebeles in each woreda where there are a minimum of four and maximum of five kebeles in each woreda. Therefore, it was decided to cover four kebeles in each woreda. An equal allocation of sample kebeles was also considered.

2.4 Sampling Procedure

Once the number of woredas, kebeles and households were estimated, the next step was determining the sampling procedure. In general, the survey employed a three-step sampling procedure. During the first step, eight woredas were selected from each region from a total of 9-10 project woredas. The woreda selection was more purposive depending on the woredas' geographical disparity and comparative advantage to provide diversified information. During the second step,

kebeles within the selected woredas were identified. As presented in Table 1.2, five kebeles in each woreda were selected for project interventions in three regions (Oromia, SNNPR and Tigray), but only four project kebeles were selected from each woreda in Amhara. This difference took into account the higher number of crossbred livestock in Amhara Region

During the third stage of the sampling procedure, livestock households within the selected kebeles were selected using a systematic, random sampling technique. Since the project is livestock focused, the ultimate target group of the survey were households which had at least one animal. In general, the kebele administration list was used as a sampling frame, but in the absence of this list, the cooperative members' list was used to select households with at least one animal (Refer to Annex I for detailed sampling procedure description).

2.5 Data Collection Instruments

The study employed both quantitative and qualitative information collection techniques. Quantitative data was collected through a structured household questionnaire while qualitative information was obtained through focus group discussions, observation and taking pictures to document those observations. The structured questionnaire has eight sections. The introductory section deals with the socio-demographic characteristics of household heads, section one inventories livestock, and section two collects key data on dairy cows and productivity while sections three and four are on fattening and poultry, respectively. Information on forage was collected in section five and sales from livestock products was collected in section six. Section seven and eight cover knowledge of livestock nutrition and new technology practices.

The questionnaire was developed and administered in English to avoid misinterpretation of technical terms during translation into different regional languages. Therefore, translation was managed through the recruitment of data enumerators who are livestock experts and understood English and local languages very well. The focus group discussion checklist was used to guide the discussion at the community level, and mainly to obtain general information on community/household practices in relation to livestock keeping, livestock productivity and sources of feed for their livestock.

The study also employed a cooperative data collection instrument to collect information from cooperatives and a discussion guideline with woreda natural resource offices in relation to rehabilitation of pasture land.

2.6 Data Enumerator Training and Piloting of the Questionnaire

2.6.1 Training of project staff

Training was organized in two phases. Phase I training was in the Addis Ababa office for all FEED II technical staff, both from Addis and regional levels. The baseline survey training was part of the general monitoring and evaluation (M&E) training which covered a range of topics, including interviewing, supervision, and focus group discussion techniques. The training took four days and was facilitated by the ACDI/VOCA Regional M&E Advisor and the FEED II Sr. M&E Specialist. During the training, detailed discussions were conducted on and needed changes made to the household questionnaire, and it was then field tested in one of the project sites in Oromia Region, Woliso. Following the pre-testing of the questionnaire, subsequent discussions were conducted to incorporate comments from the field test.

2.6.2 Data Enumerators Training

Upon finalization of the data collection instruments, the training was extended to the data enumerators in each region. Data enumerators were recruited from each woreda livestock office (except for five data enumerators recruited from D.V.M. (Doctors of Vet Medicine) in SNNPR, partly to enhance partnership and involve them in the baseline process and partly to use their local knowledge and livestock and forage expertise. The data enumerators' training was organized with the following objectives:

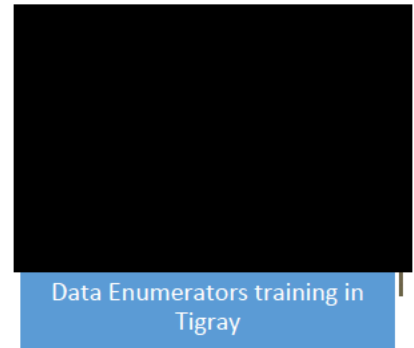
- Help enumerators become familiar with the survey method and the data collection procedure & instrument;
- Standardize the understanding of questions, recording rules and completion of the questionnaire; and
- Ensure that all enumerators perform in a manner that produces reliable data.

A training manual was prepared at the FEED II country office to support data enumerator training and ensure the provision of uniform training across the regions. The training was facilitated by FEED II country office technical and field staff who participated in the previous training.

A total of 68 (12 women) data enumerators were recruited (20 in Amhara, 16 in Tigray, 16 in Oromia and 16 in SNNPR) and trained for a day on the questionnaire and interviewing techniques. The training approach was presentation followed by discussion, a pairwise interviewing exercise in the classroom, and practical exercise in the nearby villages. Data enumerators were provided with a data collection manual to read and refer to at times of difficulty during data collection in the field. Moreover, data enumerators were provided with the lists of kebeles selected for the survey.

2.7 Data Collection and Supervision

The baseline survey process was initiated first in SNNPR on March 18, 2014 followed in Tigray region on March 19, 2014. Data collection in Oromia and Amhara Regions started one and two weeks later, respectively, due to the delay in signing of their regional agreements. Data collection for all regions was completed by April 12th, 2014. Data collection in each region began immediately following the respective data enumerators' training. In each region data collection took a maximum of two weeks including training and travel time.



Data enumerators applied the skills they acquired from the training and followed a systematic sampling procedure to identify households to interview. Upon arrival in the survey kebeles, they contacted development agents (DAs) and kebele administration staff/cooperative leaders, and collected kebele administration or cooperative membership lists as a sampling frame (See Annex I for detailed sampling procedure). They received valuable support from DAs and/or administration staff in identifying whether the selected household is livestock-holding or not and locating the selected household. Before conducting interviews, verbal consent was sought from respondents and absent respondents were revisited before being replaced. Replacement was only necessary in a few cases.



Given long distances and difficult geographical terrains between and among the selected households and kebeles, data enumerators were only able to interview an average of five households per day and took three days in each kebele. Some data enumerators stayed nights in the kebele, others stayed in nearby towns and only a few travelled daily from/to their residences.

The FEED II country office and field staff provided continuous supervisory and technical backup during the whole data collection period to ensure quality data collection. They were out in the field starting from the data enumerators training till the end of field work, and divided themselves into sub-teams. Wherever reachable, each day they received the filled questionnaire from data enumerators and reviewed for completeness, consistency and provided on site critiques. In hard to reach areas, technical support as well as supervision was provided by cellphone. Supervisors were tasked with randomly revisiting interviewed households. However, due to the distances involved and the limited number of supervisors, these revisits did not happen in most cases. The majority of survey areas had cellphone network coverage and this facilitated the communication among data enumerators and supervisors to immediately share challenges and lessons learned.

Supervisors were also tasked with qualitative information collection through focus group discussions, completing cooperative questionnaires and discussions with woreda natural resource

offices. In conjunction with the data enumerators' supervision, they were able to perform these other assigned tasks. The field work was completed and the parameters are shown in Table 2.1.

3: Table 2.1. Summary of baseline field coverage

Field Performance	Amhara	Oromia	SNNPR	Tigray	Total
Woredas covered	8	8	8	8	32
Kebeles visited	32	32	32	32	168
Households interviewed	478	480	477	479	1,914
FGDs ¹ conducted	16	16	16	16	64
Cooperatives interviewed	14	16	18	16	56
Woredas contacted for closure area information	8	8	8	8	32

¹ Focus group discussions

2.8 Data Entry, Analysis, and Write up

Immediately after the completion of the field work in each region, the questionnaires were forwarded to the project country office, and sorted by region, woreda and kebele and provided with an alphanumeric code, including the first two letters of the region. A half-day field experience sharing meeting was conducted for country office staff who were involved in the data collection as supervisors. Discussions were held on similarities and differences in experience as well as limitations of the data collection process. Following the discussions, a final review of the completed questionnaires was performed before data entry. The review included matching of kebeles with woredas, matching questionnaires with each kebele and resolution of a few measurement and survey questions such as egg production and milk data collection procedures.

SPSS was used for capturing raw data. Four experienced data entry clerks conversant in SPSS and data entry processes handled the entry and cleaning of the entered data (making sure that the entries fell within the accepted range and correcting them with accurate data from the questionnaires if not). A half-day orientation was provided for the data entry clerks, including practical demonstrations. Moreover, their work was monitored daily for effectiveness and quality. Data entry took a total of seven days.

Data results for all key indicators are provided for each region and describe the findings from the survey. Moreover, qualitative information from the focus group discussions was used to validate the findings and clarify responses from the quantitative survey. A separate report already has been produced to cover information and findings from the cooperative survey.

2.9 Limitations of the Study

During the implementation of this baseline study, the following limitations were discovered:

- Reporting can be influenced by the expectations of respondents. If they expect future support from donor funded projects, they tend to under report. This may have been the case, for example where a very high percentage of respondents reported having received ‘no training’;
- In four woredas of Tigray, enumerators mistakenly asked for milk sales per year instead of per month. Therefore, the data had to be divided by the total amount of milk and the average lactating months to get milk production per month to make it compatible with that from the other survey sites;
- In SNNPR and four woredas of Tigray, enumerators asked for egg production per clutch only, but in other survey areas, it was asked for per clutch but also estimated for the year by respondents. Moreover, in a few areas, aggregate egg production for all egg laying hens was collected instead of an average per egg laying hen. To correct this error, egg production per year was estimated by multiplying the average number of clutches for SNNPR and four woredas of Tigray. Egg production from all hens was also converted to production per hen by dividing total eggs by number of egg laying hens;
- Since either the kebele administration or cooperative members list was used as the sampling frame, this use of two different lists could compromise the uniformity of the sampling frame, but given the great majority of households are members of cooperatives, the effect is expected to be minimal;
- Some technical knowledge questions were very difficult to explain to respondents. However, this was mitigated by efforts of the enumerators to explain using examples; and
- There is still some missing information in a few of the questionnaires, particularly on age of heads of households, number of persons in the household, etc., despite the efforts made in the field to review and fully complete the questionnaires.

Despite these apparent limitations, overall the data collected is of high quality and accuracy and provides useful, key information on study areas and FEED II project indicators.

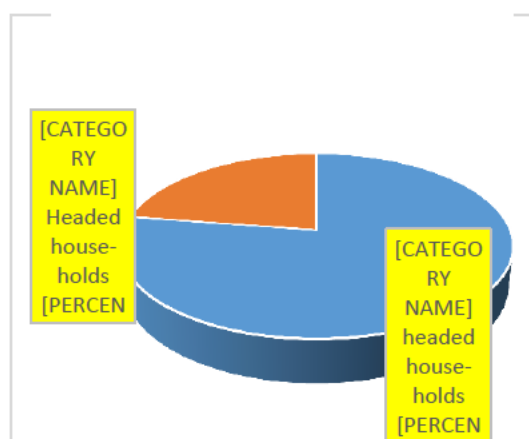
III. Survey Findings

3.1 Households Characteristics and Composition

Within each selected household either the wife or husband was eligible as a respondent. This equal opportunity was done purposely due to the fact that both the wife and the husband have the necessary knowledge to respond to the questions in the study and to ensure that women were involved in the study as respondents. A summary of data by respondent type shows that, overall, 61 percent of respondents were men and the other 39 percent were women, including women headed households. In men headed households, 23 percent of respondents were women and in women headed households four percent of respondents were men.

This section provides information about the socio-demographic characteristics of household heads, including family size.

Figure 2: Percentage by household type



3.1.1 Determination of Heads of Household

The distribution of household heads by gender is presented in Figure 2 below. As shown, 77 percent of the interviewed households are male headed; 23 percent are female headed. Regional distribution by household head is presented in Table 3.1. In Tigray, 25 percent of the interviewed households are female headed while in Amhara it is 20 percent. In SNNPR and Oromia, the percentage distribution of heads of household by male and female is almost the same, 22.3 – 22.9 percent.

4: Table 3.1: Heads of Household (HH) by Gender and Region

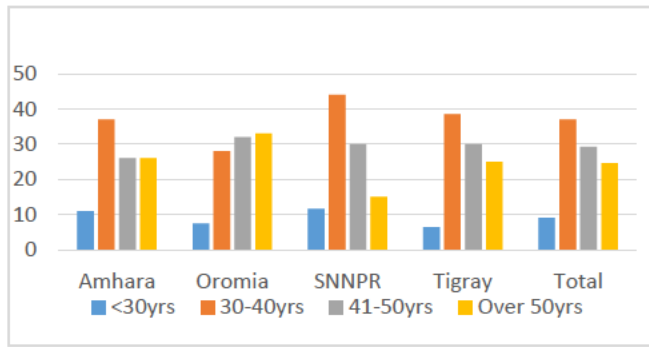
Region	% male headed	% female headed	HHs (n)
Amhara	79.9	20.1	476
Oromia	77.7	22.3	480
SNNP	77.1	22.9	477
Tigray	74.7	25.3	479
Total	77.4	22.6	1914

3.1.2 Age Distribution of Household Heads

Age is an important demographic factor that affects livestock keeping and productivity. Age distribution of household heads is presented in Figure 3 by region. The age distribution pattern across the region is similar to the averages across the region with a small percentage of heads being under 30 years old and a higher percentage of heads being in the 30-40 year old age group. The

distribution in the last two age groups, 41-50 and over 50, looks similar in all regions, except in SNNPR where the last age group is a lower percentage than its preceding age group. The pattern likely indicates that household heads in the younger age groups do not have any livestock and may, therefore, have been excluded from the survey.

Figure 3: Percentage Age Distribution of Heads by Region



3.1.3 Educational Status of Household Heads

Information on educational status was collected as an important background characteristic of household heads. Figure 4 depicts data on the percentage distribution of different educational levels among household heads. Overall, 32 percent of household heads are illiterate and 22 percent have some reading and writing skill, but no formal education. Thirty-three percent have attended primary school while 11 percent had some secondary schooling. Regionally, thirty-eight percent of household heads in Tigray and Oromia have some primary education followed by 35 percent in SNNPR. Household heads with secondary education are almost the same in Oromia and SNNPR at 16.4 and 17.6 percent, respectively. Illiteracy is highest in Tigray at 39 percent and lowest in Oromia at 22 percent. Reading and writing skill with no formal education is highest in Amhara at 38 percent and lowest in SNNPR at 12 percent.

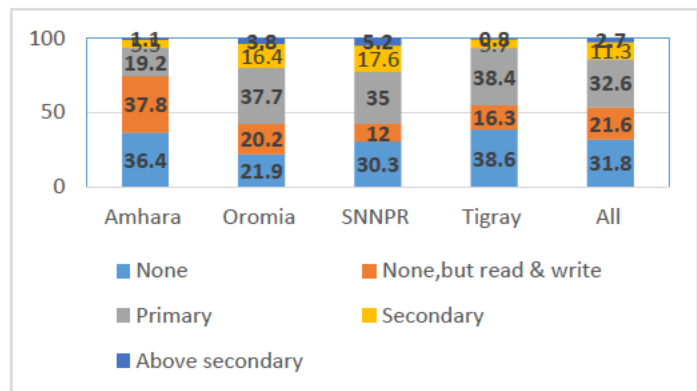


Figure 4: Percentage of Heads by Educational Status

3.1.4 Mean Family Size

The total number of persons in the household ranges from 1 to 14 with a mean of 6.2. Mean family size is highest in SNNPR at 7.1 and lowest in Amhara at 5.6 persons per household. Table 3.2 below presents mean family

5: Table 3.2: Mean Family Size by Region

Region	Mean	N	Minimum	Maximum	S.D.
Amhara	5.6	475	1	12	1.9
Oromia	6.4	476	1	14	2.1
SNNPR	7.1	472	2	14	2.4
Tigray	5.7	473	1	11	2.0
Total	6.2	1,896	1	14	2.2

Note: A few households in each region did not respond to the question on the number of persons in the household

3.1.5 Cooperative Membership

Field information indicated that there are different types of cooperatives in the kebeles in which households are members, including multi-purpose, livestock, bee keeping, and credit and savings cooperatives. Some households are also members of more than one cooperative. Figure 5, below shows membership status by region. Overall, 82 percent of interviewed households are members of one to two cooperatives. Membership ranges from 91 percent in Amhara to 77 percent in Oromia.

As shown in Table 3.3 below, over 70 percent of the surveyed households are members of multi-purpose cooperatives while only six percent are livestock cooperative members. Four percent of surveyed households are members of both types of cooperatives.

6: Table 3.3: Household membership by types of cooperative

Cooperative types	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
Livestock	1.3	7.7	10.7	2.7	5.6
Multipurpose	85.4	65.4	64.6	67.4	70.7
Livestock & Multipurpose	4.0	3.3	3.1	4.8	3.8
Credit & savings only	-	-	-	6.5	1.6
Non-members	9.4	23.5	21.3	18.3	18.1

3.2 Livestock Population and Composition

Households were requested to report on the maximum number of livestock they possessed at any point in time during the 12 months preceding the survey. Information on livestock was collected by the following categories: mature cow, mature bull/ox (> 2 years), heifer, male cattle (6 months to 2 years) and calf (any sex < 6 months) for both indigenous/local and improved breed types. This section presents the survey findings in relation to the livestock populations and holding by breed types.

3.2.1 Mature Cow Holding and Population in the Study Households

For the purposes of this baseline study, mature cow refers to female cattle that have at least one calf. Table 3.4 below presents the percentages of livestock farming households by holding size, region and breed types. Across the survey areas, 21 percent of livestock farming households had no indigenous and 78 percent had no crossbred mature cows during the 12 months preceding the study. Overall 62 percent of surveyed households reported holding 1 to 2 mature local cows. Very few own crossbred cows, the mean being less than one for every two farmers. Only 751 mature crossbred cows were registered in the surveyed households as compared to 2,871 local mature cows. However, the proportion of crossbred cows in this sample set is considerably more than the national figure of 1.88%. This 10-fold difference is a logical result of the criteria used in the selection of project unions and districts within which FEED II activities will be implemented.

Regionally, the livestock holding distribution pattern is similar. Average local mature cow holdings range from 1.6 in Amhara and Oromia to 1.3 in SNNPR, whereas average crossbred cow holding is less than one in the other two regions.

7: Table 3.4: Percentage of Interviewed Households by Size of Mature Cow Holdings, Region and Breeds

Heads of Mature cows	Amhara (n=478)		Oromia (n=480)		SNNPR (n=477)		Tigray (n=479)		Total (n=1,914)	
	Indigenous	Crossbred	Indigenous	Crossbred	Indigenous	Crossbred	Indigenous	Crossbred	Indigenous	Crossbred
No mature cow	22.8	84.1	19.0	67.9	23.3	74.6	20.0	83.3	21.3	77.5
1-2 head	57.1	14.9	62.1	24.2	65.2	23.5	65.3	15.2	62.4	19.4
3-4 head	16.5	1.0	16.3	6.9	9.4	1.7	9.8	.8	13.0	2.6
5-9 head	3.6		2.5	.8	1.7	.2	3.5	.6	2.8	.4
10-19 head	-	-	.2	.2	.4		1.3		.5	.1
Cow count	754	110	752	340	636	174	729	127	2871	751
Manure cow holding	1.57	0.2	1.56	0.7	1.3	0.4	1.7	0.3	1.5	0.4

3.2.2 Mature Bull/Ox Population and Holding

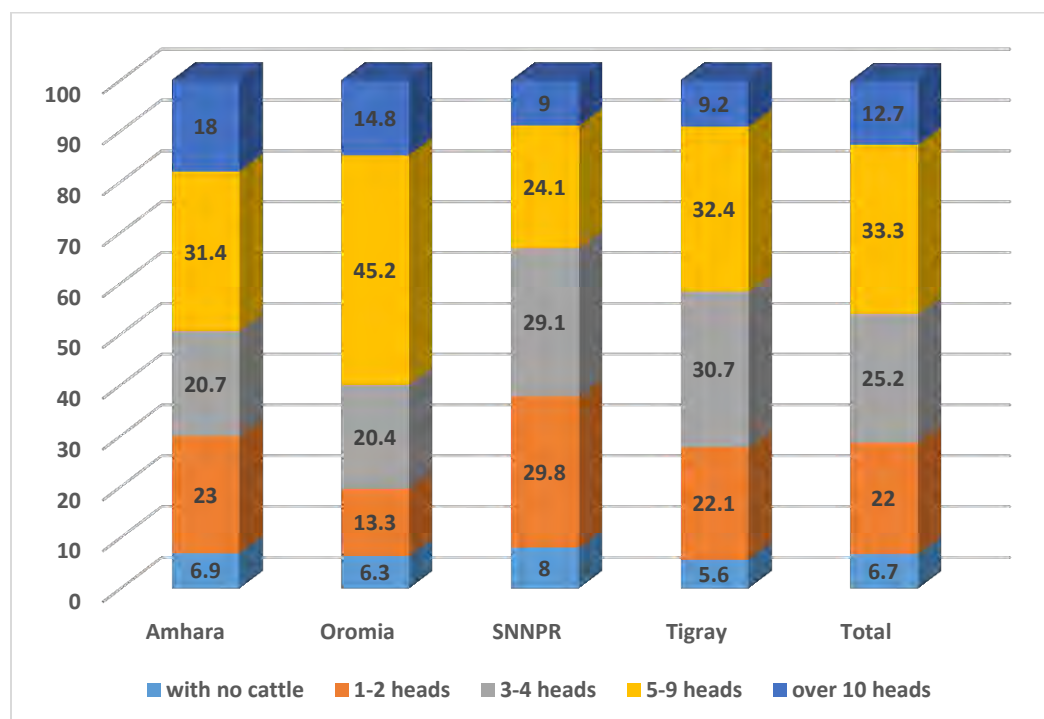
Mature bull/ox is defined as male cattle over two years of age. Table 3.5 below presents the percentage distribution of interviewed households by holding size and type. Overall, 26 percent of farming households have had no local bulls/oxen in the last one year while 90 percent were had no crossbred bulls/oxen. Regionally, there is little variation in the mean holding for local bulls/oxen. These livestock holding households are primarily crop farmers and mainly use bulls/oxen power for farming, so bull/ox holding is in low numbers.

8: Table 3.5: Percentage of interviewed households by size of Bulls/Oxen holding

Heads of Mature Bull/Ox	Amhara		Oromia		SNNPR		Tigray		Total (n=1,914)	
	Indigenous	Cross-bred	Indigenous	Cross-bred	Indigenous	Cross-bred	Indigenous	Cross-bred	Indigenous	Cross-bred
No bull/ox	24.9	91.4	17.1	80.4	35.8	93.9	27.8	95.4	26.4	90.3
1-2	52.1	7.9	51.7	17.1	54.5	5.9	57.6	3.8	54.0	8.7
3-4	19.5	.4	24.4	2.5	6.9	.2	11.3	.4	15.5	.9
5-9	3.1	.2	6.5		2.5		2.1	.4	3.6	.2
10-19	.4		.4		.2		.8		.5	-
20-49	-	-	-	-	-	-	.4	-	.1	-
Count	803	56	1020	157	555	37	778	42	3156	292
Mean	1.7	0.1	2.1	0.3	1.2	0.1	1.6	0.1	1.6	.2

3.2.3 Cattle Population and Holding

The cattle population is the sum of mature cows, mature bulls/oxen (> 2 years), heifers, male cattle (6 months to 2 years), and calves (any sex < 6 months). Overall, a total of 9,778 local cattle have been registered from the surveyed households, and households have a mean cattle holding of 5.1. Figure 6 and Figure 7 below present holding of indigenous and crossbred cattle by region. The highest indigenous cattle population is in Oromia while the smallest is in SNNPR.



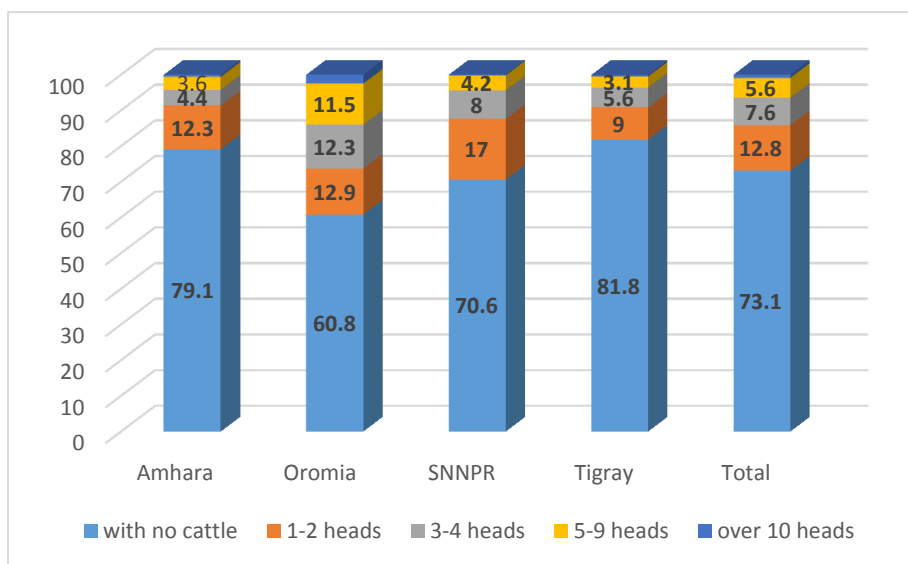
5: Figure 5: Percentage of households by size of Indigenous cattle holding and region

As presented in Figure 5 above, across regions less than 8 percent of households had no cattle. A considerable percentage of the households owned 1 to 2 cattle ranging from 13 percent in Oromia to 30 percent in SNNPR. Tigray and SNNPR had the most households with 3 to 4 cattle, at 31 and 29 percent, respectively. In Oromia 45 percent of households possessed 5 to 9 cattle followed by SNNPR and Amhara at 32 and 31 percent, respectively. Eighteen percent of households in Amhara reported holding 10 cattle and above during the reference period followed by Oromia at 15 percent

Furthermore, the analysis of cattle holding by gender of head of household shows that male headed households owned on average 5.4 cattle while female headed households owned an average 3.9 cattle. As expected, a higher percentage of female headed households have no cattle, 9.2 percent compared to 5.9 percent of male headed households. At the highest holding category, 10 and above, the percentage of male headed households is three-fold that of for female headed households. Table 3.6 below presents indigenous cattle holding by size and gender of household head.

9: Table 3.6: Percentage of Households by Size of Indigenous Cattle Holdings and Gender of Head

Size of cattle holding	Male headed	Female headed	Total
No cattle	5.9	9.2	6.7
1-2 head	21.1	25.2	22.0
3-4 head	23.5	31.2	25.2
5-9 head	34.3	29.8	33.3
10+ head	15.1	4.6	12.7
Total (n)	1,481	433	1,914
Mean cattle holding	5.4	3.9	5.1
Cattle count	8,066	1,712	9,778



6: Figure 6: Percentage Distribution of households by Crossbred Cattle Holding and Region.

In contrast to indigenous cattle holdings, crossbred cattle ownership is lower with only 27 percent of households overall reported to own crossbred cattle. Eighty-two percent of households in Tigray and 79 percent in Amhara have no crossbred cattle. However, despite being lower than indigenous holdings these results indicated much higher crossbred cattle ownership than the national average, a likely result of the project participant selection criteria.

During focus group discussions, participants indicated that indeed the cattle population is predominantly local (indigenous types), but recently there has been a shift to crossbreeds because of increased access to artificial insemination and pure-bred bull services. Access to artificial insemination is available from Woreda Agriculture offices and there are also exotic bull services, so in the future there is high potential for the crossbred cattle population to increase. Other participants pointed out that though awareness and knowledge on the advantages of crossbred stock is high, the shortage of feed has discouraged community members from keeping them. The management system for livestock is also changing from extensive, free grazing to more intensive, cut and carry, but the absence of an adequate and inexpensive feed supply is posing a difficult challenge.

3.2.4 Sheep and Goat Holding

Sheep ownership among the surveyed households is 54 percent during the 12 months preceding the survey. Regionally, in Tigray, and SNNPR 53 percent and 49 percent, respectively, did not own sheep while the figures in Oromia and Amhara are less at 40 and 43 percent, respectively. The number of sheep held varies widely at the regional level, and is less in SNNPR where mean sheep holding is 1.6, but higher in Oromia and Tigray as the mean sheep holding is 4.6 and 4.3, respectively.

10: Table 3.7: Percentage of Households (HHs) by Local Sheep Holding

Indigenous Sheep holding	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
HHs with no sheep	42.7	40.2	48.8	53.2	46.2
1-4 sheep	34.3	30.2	40.0	15.2	29.9
5-9 sheep	18.4	15.0	10.1	14.8	14.6
10-49 sheep	4.4	13.8	1.0	15.9	8.8
50-99 sheep	0.2	0.8	0.0	0.8	0.5
No. of HHs	478 (100)	480 (100)	477 (100)	479 (100)	1,914 (100)
Sheep count	1,350	2,231	780	2,077	6,438
Mean	2.8	4.6	1.6	4.3	3.3

Note: Information on crossbred sheep is not presented here as overall ownership stands at only 1.7 percent

The regional distribution of sheep holding in Table 3.7 above, shows that holding is concentrated at lower levels between 1 and 10 sheep, except in Tigray where 16 percent of holders owned over 10

sheep. Higher sheep populations were found in Oromia with 2,231 heads of sheep and then Tigray with 2,077.

Table 3.8 below presents overall goat populations and goat ownership by household by region. Overall, 83 percent of surveyed households did not own goats during the year preceding the survey. Mean goat ownership ranges from 0.7 in Amhara to 1.7 in Tigray.

11: Table 3.8: Percentage of Households (HHs) by Size of Local Goat Holding

Sheep Size	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
HHs with no goat	87.0	78.5	87.6	80.4	83.4
1-4 goats	7.9	15.2	8.0	6.9	9.5
5-9 goats	2.7	4.8	2.5	6.3	4.1
10-49	2.3	1.5	1.9	6.3	3.0
50-99	-	-	-	0.2	0.1
No of HHs	478(100)	480(100)	477(100)	479(100)	1914(100)
Goat count	345	439	339	811	1934
Mean goat holding	0.7	0.9	0.7	1.7	1.01

3.2.5 Chicken Population and Holding

For the purposes of this survey, chickens include cocks, cockerels, pullets, laying hens, non-laying hens and chicks both of indigenous and improved types. Table 3.9 below presents the percentage of households by the size of chicken holding, chicken population, and region for indigenous chicken.

Overall, 35 percent of households had no local chickens during the reference period. The livestock and livestock characteristics study conducted by the Central Statistics Authority (CSA) for 2012/2013 found that at the national level 43.2 percent of households had no poultry. The finding for this survey is lower at 35 percent, perhaps due to the fact that the survey was conducted in high livestock potential areas.

From Table 3.9 below, it is apparent that chicken holding among respondents concentrates at 1 to 9 and then at 10 to 49 heads per household. Overall, the mean chicken holding is 5.7 heads with a total registered local chicken population of 11,077 for the four regions. Regionally, mean local chicken holding looks similar, ranging from 6.4 in Amhara to 5.3 in Tigray.

12: Table 3.9: Percentage of Local Chicken Holding Households

Local chicken holding	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
HHs with no chicken	31.8	33.3	37.9	34.9	34.5
1-9 head	43.5	43.5	40.0	45.5	43.2
10-49 head	24.1	22.9	21.4	19.4	21.9
50-99 head	0.6	0.2	0.6	-	0.4

100+	-	-	-	0.3	0.1
No of HHs (n)	478	480	477	479	1914
Chicken count	3,065	2,655	2,759	2,528	11,077
Mean chicken holding per HH	6.4	5.5	5.8	5.3	5.75

Data disaggregation by gender of heads of household shows that similar to cattle, chicken holding is higher in male headed households. While 33 percent of male headed households had no local chickens during the reference period, 40 percent of female headed households had no chickens. Local chicken holding for women headed households decreased from 41 to 19 percent for 1-9 and 10-49 chickens, respectively. Table 3.10 below presents chicken holding by gender of household head.

13: Table 3.10: Percentage of Households (HHs) by the Size of Local Chicken Holding and Gender of Household Head

Size of local chicken holding	Male headed	Female headed	Total
No poultry	32.8	40.2	34.5
1-9 heads	43.9	40.6	43.2
10-49 heads	22.8	18.9	21.9
50-99 heads	0.4	0.2	0.4
100 & + heads	0.1	-	0.1
Total HHs (n)	1,481	433	1914
Mean local chicken holding	5.9	5.0	5.7
Chicken count	8,831	2,176	11,007

With regards to improved chickens, only 15 percent of the households surveyed said they owned some. In Amhara region, only 9 percent owned improved chickens while in Tigray it was considerably higher at 24 percent.

The mean number of improved chickens owned is highest at 7 in Oromia and lowest at 0.6 in Amhara. A total of 5,888 improved chickens were registered during the survey and the majority of them (57.3 percent) were from Oromia and only 5 percent from Amhara. This shows a big divergence between regions in terms of improved chicken populations.

14: Table 3.11: Percentage of Households (HHs) by Improved Chicken Holding

Improved chicken holding	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
HHs with no improved chickens	90.6	84.8	87.0	76.4	84.7
1-9 head	7.1	12.9	10.1	18.2	12.1
10-49 head	2.3	2.1	2.9	5.0	3.1
50-99 head	-	-	-	0.2	0.1
100+	-	-	-	0.2	0.1
No of HHs (n)	478	480	477	479	1914
Improved chicken count	300	3,376	473	1,739	5,888
Mean improved chicken holding	0.6	7.0	0.99	3.6	3.1

In the discussions conducted with community members, chicken populations by type were one of the topics covered. Participants pointed out that in general the chicken population is dominated by local types. In a few woredas of Tigray, for the last eight years, eggs from improved chickens were hatched by local hens to obtain improved chickens. In addition, agricultural offices distributed improved chickens in some woredas. Hence the number of improved chickens is on the increase at a higher rate in Tigray.

In a few woredas of SNNPR, respondents indicated that chickens are mainly local types because improved chickens are at risk of dying, particularly in the months of February to April. For example, in one kebele of Oromia, respondents said that farmers do not yet practice improved poultry just to avoid the risk of having them all die.

In Libokemekem woreda of Amhara, it was reported that two years ago improved chicken types were introduced by the agriculture office, but the number distributed was inadequate. Respondents indicated that “we have already registered and are waiting to receive improved chickens”.

3.2.6 Donkey Population and Holding

Donkeys are pack animals, mainly used for transportation of animal feed, fire wood, harvest and household goods. Across the survey areas, 54 percent of livestock farmers do not have donkeys, while 41 percent owned one to two donkeys and 5.4 percent owned 3 and over. Donkey ownership is more prevalent in Oromia where 53 percent of the households hold one or two donkeys. Donkey holding is lower in SNNPR as only 198 donkeys have been registered from the surveyed households and mean holding is less than one donkey for every two households.

15: Table 3.12: Percentage of Households (HHs) by Donkey Holding

Donkey holding	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
HHs with no donkey	62.3	34.0	66.0	52.2	53.6
1-2 head	35.6	53.1	33.3	42.0	41.0

3 + head	2.1	12.9	0.6	5.8	5.4
No of HHs (n)	478	480	477	479	1,914
Donkey count	269	600	198	357	1,424
Mean donkey holding per HHs	0.56	1.25	0.4	0.7	0.7

3.3 Dairy Cows and Productivity

3.3.1 Dairy Cow Holding

Information on dairy cows and productivity was collected in section two of the household questionnaire. In the previous section, information on mature cows is presented and discussed, but this section presents findings on dairy cows and their productivity as well as feeding and management of dairy cows.

Table 3.13 below presents the percentages of interviewed households having or not having dairy cows during the last year, irrespective of breed types. Dairy cow refers to a cow giving milk during the last 12 months. As shown in the table, the vast majority (79.4 percent) of interviewed households reported having dairy cows during the last year. Regionally, SNNPR took the lead at 88 percent followed by Oromia at 84 percent. This finding is an indication that milk production is a common activity in the study areas.

16: Table 3.13: Percentage of Interviewed Households that Own Dairy Cows

Do you have dairy cows?	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
Yes	72.4	84.0	88.1	73.3	79.4
No	27.6	16.0	11.9	26.7	20.6
Total HHs (N)	478	480	477	479	1,914

Very few respondents possessed other than indigenous dairy cows. As shown in Table 3.14 below, close to 60 percent of the interviewed households across the study areas reported that they had only local dairy cows. Regionally, SNNPR has the highest percentage of households with local dairy cows (64 percent) while Oromia has the least at only 55 percent.

With regards to crossbred dairy cows, overall holding of crossbred dairy cows stands at only 13 percent among the interviewed households across the study areas. Eighteen percent of the interviewed households in SNNPR have owned crossbred dairy cows only. About 8 percent of the respondents owned both local and crossbred types.

17: Table 3.14: Percentage of Interviewed Households by Types of Dairy Cow Ownership and Region

Types of Dairy Cows	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
Local (indigenous) only	59.0	55.0	63.9	58.0	59.0
Crossbred only	8.6	13.5	17.6	10.9	12.6
Both types	4.8	15.4	6.5	4.4	7.8
Have no dairy cows	27.6	16.0	11.9	26.7	20.6
Total (N)	478	480	477	479	1,914

Table 3.15 below presents the holdings of local dairy cows by number and region. Similar to cattle holding, local dairy cow holding concentrates around 1 to 2 per household as 60 percent of interviewed households reported having one or two local dairy cows.

18: Table 3.15: Percentage of interviewed Households by number of local dairy cows and region

Number of local Dairy Cows	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
No. local dairy cow	36.2	29.6	29.6	37.6	33.2
1-2 head	55.9	64.4	62.7	56.6	59.9
3-4 head	7.5	5.4	7.1	4.0	6.0
5-9 head	0.4	0.6	0.6	1.9	0.9
Total HHs (n)	478	480	477	479	1914
Mean Local Dairy Cow	0.99	1.04	1.02	0.93	1.00
Count	475	501	487	445	1,908

Overall, 19 percent of the interviewed households have one or two crossbred dairy cows while 1.4 percent owned 3 to 4 crossbred dairy cows.

19: Table 3.16: Percentage of interviewed Households by number of crossbred dairy cows and region

Number of crossbred dairy cows	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
No crossbred dairy cow	86.6	71.0	75.9	84.8	79.6
1-2 heads	12.8	25.2	23.1	14.4	18.9
3-4 heads	0.6	3.3	1.0	0.6	1.4
5-9 heads	-	0.4	-	0.2	0.2
Total HHs (n)	478	480	477	479	1914
Mean Crossbred Dairy cow	0.18	0.48	0.32	0.2	0.29
Count	85	229	153	96	563

Local dairy cow holding by gender of the head of the household is presented in Table 3.17 below. Average holding for female headed households is a bit less than one while for male headed households it is a bit greater than one. At lower holding size (1 to 2), percentage of female headed households is higher than male headed and conversely, at higher holding size (3 to 4) the percentage of female headed is lower than male headed. This is an indicator that holding for female headed is centered on lower sizes.

20: Table 3.17: Local Dairy Cow Holding by Gender of Household Head

Size of local Dairy cows holding	Male headed	Female headed	Total
No local dairy cow	33.0	34.2	33.2
1-2 heads	58.9	63.3	59.9
3-4 heads	7.2	2.1	6.0
5-9 heads	1.0	0.5	0.9
Total HHs (n)	1,481	433	1,941
Mean local dairy cow holding	1.04	0.86	1.0
Dairy cow count	373	1,535	1,908

3.3.2 Dairy Productivity

Information on dairy productivity was collected by asking for the maximum and minimum amount of milk the household collected in a typical day during the last year from all of the lactating cows the household owned, including both local and crossbred lactating cows. As presented in Table 3.14 above, 59 percent of households owned only local/indigenous lactating cows and the total number of lactating cows was 1,701. About 13 percent of households owned only crossbred cows and the number of crossbred lactating cows was 371. Seven point eight percent of households reported having both indigenous and crossbred lactating cows and had a total of 399 lactating cows. The maximum and minimum quantities of milk reported from these lactating cows is summarized in Table 3.17, including the number of cows by type.

21: Table 3.18: Maximum and Minimum Amount of Milk Collected in a Typical Day by Number of Lactating Cows

Types of Lactating cows	Number of Lactating cows	Maximum total amount of milk collected from all lactating cows (liters/day)	Minimum total amount of milk collected from all lactating cows (liters/day)	Average maximum amount of milk collected (liters/cow/day)	Average Minimum Amount of milk collected (liters/cow/day)	Max/min average (liters/cow/day)
Indigenous/local	1,701	3,256.35	1,569.03	1.91	0.92	0.99
Crossbred	371	2,744.75	1,410.5	7.4	3.8	3.60

Both types	399	1,278	524.0	3.2	1.31	1.89
Total	2,471	7,279.7	3,503.53	2.95	1.42	1.53

As summarized in Table 3.18 above, the maximum amount of milk produced from 1,701 indigenous lactating cows in a typical day during the last year was 3,256.35 liters while the minimum was 1,569.03 liters. This provides an average maximum milk production of 1.91 liter/day/cow and average minimum of 0.92 liter/day/cow with a range of 0.99 liter/day/cow. Similarly, 371 crossbred lactating cows produced a maximum of 2,744.75 liters of milk and a minimum of 1,410.5 liters milk during the last year. On the average, each crossbred cow produced a maximum and minimum of 7.4 and 3.8 liters of milk, respectively. Average of maximum and minimum milk values are 0.99 liters/day for local and 3.6 liters/day for crossbred cows.

Table 3.19 below presents milk production by region. If one compares indigenous cow milk production by region ranges from 0.66 liter/day/cow in Amhara and 1.21 liters/day/cow in Tigray. In terms of crossbred milk production, it ranges from 1.84 liters/day/cow in Amhara to 4.85 liters/day/cow in Tigray. The low milk production by crossbred cows in Amhara may be due to the small number of crossbred cows and lack of proper nutrition.

22: Table 3.19: Maximum and Minimum Amount of Milk Collected in a Typical Day by Number of Lactating Cows and Region

Region	Types of Lactating cows	Number of Lactating Cows	Maximum total amount of milk collected from all lactating cows (liters/day)	Minimum total amount of milk collected from all lactating cows (liters/day)	Average maximum amount of milk collected (liters/cow / day)	Average Minimum Amount of milk collected (liters/cow / day)	Max/min average (liters/cow / day)
Amhara	Indigenous/local	439	576.84	285.87	1.31	0.65	0.66
	Crossbred	55	246.25	145.0	4.48	2.64	1.84
	Both types	66	158.5	61.0	2.4	0.92	1.48
	Total	560	981.59	491.87	1.75	0.88	0.87
Oromia	Indigenous/local	387	720.4	257.69	1.86	0.67	1.2
	Crossbred	128	1,050.5	502.5	8.21	3.93	4.28
	Both types	215	735.0	319.0	3.42	1.48	1.93
	Total	730	2,505.9	1,079.19	3.43	1.48	1.95
SNNPR	Indigenous/local	452	972.56	548.71	2.15	1.21	0.94
	Crossbred	116	781.0	445.0	6.73	3.84	2.9
	Both types	72	238.5	86.5	3.31	1.2	2.11
	Total	640	1992.06	1138.72	3.11	1.78	1.33
Tigray	Indigenous/local	423	986.55	476.75	2.33	1.13	1.21
	Crossbreed	72	667.00	318.0	9.26	4.42	4.85
	Both types	46	146.6	57.5	3.19	1.25	1.94
	Total	541	1800.15	852.25	3.33	1.58	1.75

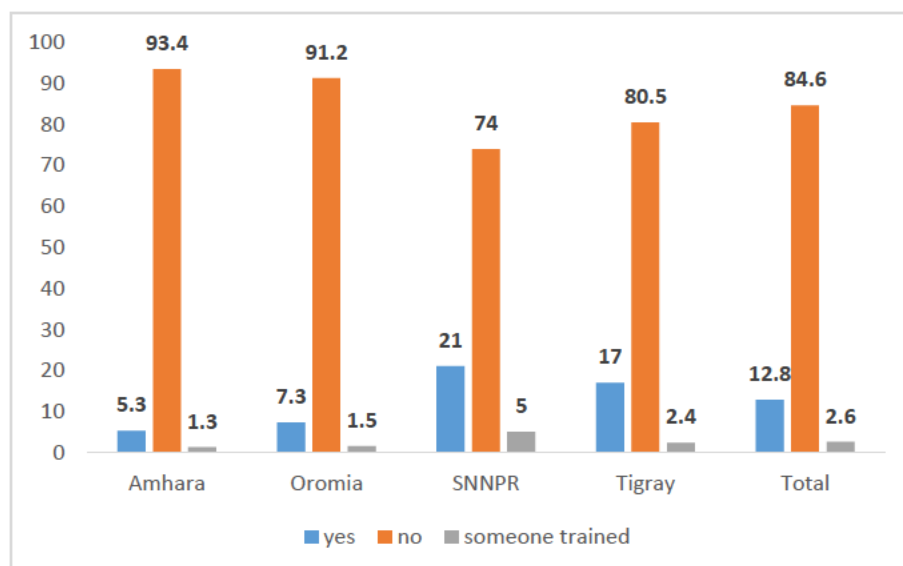
The findings in Table 3.18 and Table 3.19 above are similar to what was reported during focus group discussions. Participants explained that milk production depends on the types of cows and availability of feed as well as access to irrigation for forage production. In each region, they do have their own local breeds known for high milk production. For example, in Amhara, they call them ‘Fogera type’ and in Tigray they call them ‘Begait or Borena types’. These types are locals but higher milk producing cows. They further explained that milk production is 2 liters/day for home fed cows and less than a liter for grazing cows. They also compared milk production in relation to access to irrigation. In Tigray, Raya Zebo woreda, respondents pointed out that due to access to irrigation, green feed is available for lactating cows, so crossbred cows provide 6 liters/day and locals 2 liters/day. However, this qualitative data needs further and detailed assessment. Indigenous and crossbred cows lactate an average of 8.4 and 9.4 months, respectively.

3.3.4 Dairy Cow Feed and Training on Dairy Animal Nutrition

Dairy cow owners were asked if they have fed any of the items listed in Table 3.20 below to their dairy cows during the last year preceding the survey. Their responses showed that crop residue was the main feed type they provided to their dairy cows across the study areas. Green forage also was provided to dairy cows by over 92 percent of respondents in Amhara and Tigray. Concentrates or factory formulated feed was used by only 4 percent of owners across the study areas while agro-industrial products were used by 31 percent.

23: Table 3.20 Percentage of Dairy Cow Owners by Types of Feed they provided to their Dairy Cows

Types of feed	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
Concentrates (factory formulated & mixed)	2.3	3.7	6.0	4.3	4.1
Agro-industrial by-products (wheat bran, oilseed cake, molasses, brewers grain, etc.)	18.8	36.0	41.4	22.5	30.5
Other high quality feed (atela, grains)	93.4	67	47.6	65.0	67.2
Green forage, grass, hay, silage	95.1	75.2	75.2	92.0	89.1
Crop residue (teff straw, wheat straw, maize stover)	96.8	96.0	96.0	94.8	96.4



7: Figure 7: Training on Dairy Animal Nutrition and Management

During focus group discussions, respondents noted that concentrates or factory formulated feeds and agro-industrial products are not accessible and expensive to purchase. Wheat bran and other factory formulated ingredients and feed are affordable for rich people only. They pointed out that they are crop producers - maize, teff, wheat are the main crops produced in their areas - and crop residues and hay are their main sources of

dairy animal feed. In Tigray it was also pointed out that cactus leaf is the main dairy animal feed, especially during dry season while in SNNPR grass, banana leaves with stems and broken fruits are the main daily animal feeds.

As to training on dairy animal nutrition, a very high percentage of dairy cow owners (85 percent) reported that they did not receive any training. There were higher rates of trained households in SNNPR at 21 percent followed by Tigray at 17 percent. This was in contrast to the fact that respondents explained that training has been provided by development agents and woreda agriculture experts. Male respondents explained that training is given by the office of Agriculture, and men received most of the trainings, including experience sharing from other kebeles. Women also indicated that training is mainly provided to men at the farmer training center (FTC), but very few apply the knowledge gained from these trainings. The nature of the training is, however, practical and can be easily applied, according to women participants.

3.3.5 Persons Responsible for Dairy Activities

The study also looked into 'who is mainly responsible' for managing dairy cow activities and the findings are summarized and presented in Table 3.20 below. This question was mainly to assess gender based activities and partly to identify the target persons on which dairy cow related training should focus.

24: Table 3.21: Percentage of Persons Responsible for Dairy Cow Management

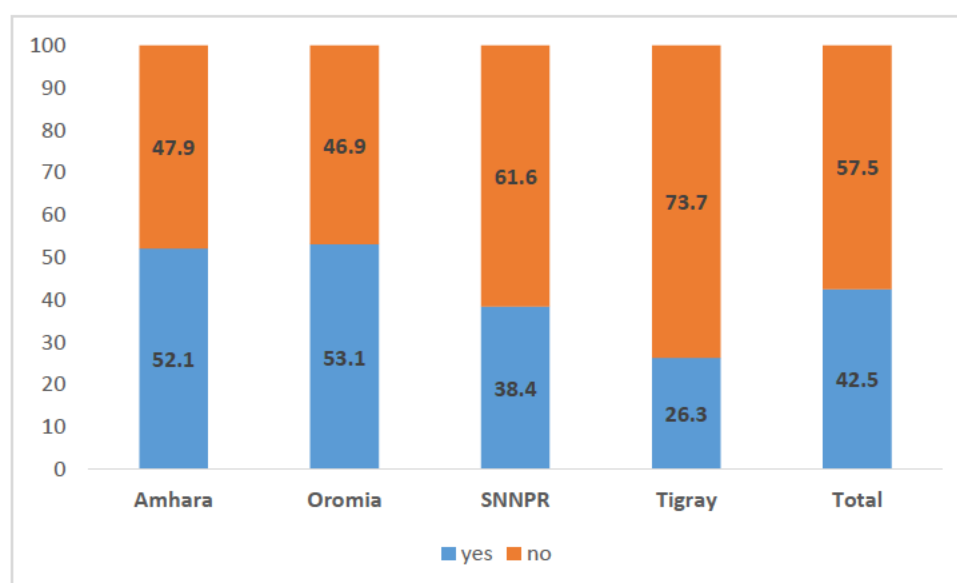
Activities	Adult women	Adult men	Adult women & adult men equally	Children < 18 age	Total
Stall cleaning	68.7	12.0	6.5	12.8	100.0

Feeding	39.1	32.3	17.5	11.2	100.0
Feed collection	22.8	55.6	14.1	7.5	100.0
Feed purchasing	24.5	65.0	8.2	2.3	100.0
Milking	66.6	24.9	6.0	2.5	100.0
Milk processing (butter, cheese, etc.)	92.1	4.3	0.9	2.7	100.0
Selling of cows and calves	22.0	65.7	11.4	0.9	100.0
Selling of dairy products	90.4	6.1	2.0	1.5	100.0

As shown in Table 3.21 above, women are mainly responsible for cleaning the cow shelter, milking, milk processing, and selling of milk products. Men are highly involved in feed collection, feed purchase and selling cows and calves. Men and women tend to participate more equally in feeding and feed collection. The involvement of children under 18 seems to be low, as low percentages were reported for each activity. During discussions with communities, it was said that children are free to refrain from livestock activities to attend school.

3.4 Fattening

Information on fattening was collected through section three of the household questionnaire. Respondents were requested to respond if they were involved in fattening activities during the study reference period. Figure 8 below presents the findings on fattening. Overall about 43 percent of respondents were involved in fattening of cattle, sheep and/or goats during the 12 months preceding the survey. Oromia and Amhara had higher proportions of households fattening their animals at 53 and 52 percent, respectively, as compared to SNNPR and Tigray.



8: Figure 8: Fattening during the past 12 months

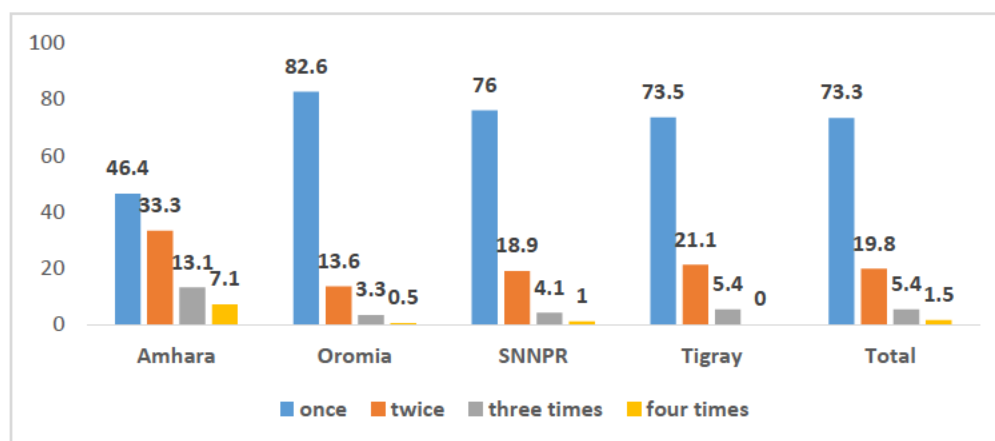
3.4.1 Cattle Fattening

As illustrated in Table 3.22 below, across the study areas, 68 percent of the interviewed households were not involved in fattening of cattle during the last year. Regionally, 82 percent of respondents were not involved in Tigray and 69 percent were not involved in SNNPR.

25: Table 3.22: Percentage of Households by Number of Cattle Fattened

Number of Cattle Fattened	Amhara	Oromia	SNNPR	Tigray	Total
No cattle fattened	61.3	59.2	69.2	82.3	68.0
1-2 cattle fattened	34.7	32.5	27.3	10.0	26.1
3-4 cattle fattened	2.5	5.8	2.7	3.8	3.7
5-9 cattle fattened	1.0	2.3	0.6	2.3	1.6
10+ cattle fattened	0.4	0.2	0.2	1.7	0.6
No. HHs that fattened cattle	185	196	147	85	613
Total cattle fattened	303	366	235	389	1,293
Mean number of cattle fattened	1.64	1.87	1.59	4.57	2.10

Overall, 26 percent of respondents fattened 1 to 2 cattle and about four percent fattened 3 to 4 cattle. Thirty-five and 33 percent of respondents from Amhara and Oromia, respectively, fattened an average of 1 to 2 cattle. Among households involved in fattening cattle, the fattened average ranges from 1.59 cattle in SNNPR to 4.57 in Tigray in the last year. While in Tigray, only a few households (n=85) were involved in fattening of cattle, on average these households fattened about five cattle/per year. However, in other regions, cattle fattening was limited to about two/per year.



9: Figure 9: Percentage of households by frequency of cattle fattening

In terms of frequency of fattening during a year, it ranges from one to four times per year. Figure 9 above presents the percentage distribution of respondents by frequency of cattle fattening and region. As shown in the chart, the great majority of farmers fatten only once per year, particularly in Oromia (over 82 percent). This indicates, the low intensity of fattening across the study areas. Based on questionnaire responses, the length of each fattening period ranges from 30 days to 365 days, but these extremes are too short and too long, respectively, to be considered true fattening. On average, the length of fattening was 116.56 days. Regionally, the average fattening periods were 131.16, 118.47, 107 and 106 days for SNNPR, Oromia, Amhara and Tigray, respectively.

3.4.2 Sheep Fattening

About 80 percent of respondents reported that they were not involved in fattening of sheep. Involvement in sheep fattening was extremely low in Tigray and SNNPR, as only 11 and 14 percent, respectively, practiced sheep fattening in the last year. In Tigray, although the number of households involved in sheep fattening was small (n=54), the average number of sheep these households fattened was one of the highest at 8.37. In SNNPR, the number of households that fattened sheep as well as their average number of sheep fattened was small.

26: Table 3.23: Percentage of Households by number of sheep fattened

Number of sheep Fattened	Amhara	Oromia	SNNPR	Tigray	Total
No sheep fattened	71.3	73.5	85.5	88.7	79.8
1-4 sheep fattened	22.8	13.5	13.4	4.4	13.5
5-9 sheep fattened	3.1	5.0	0.8	3.8	3.2
10-49 cattle fattened	2.7	7.9	0.2	2.9	3.4
50 and + cattle fattened	-	-	-	0.2	0.1
No HHs fattened sheep	137	127	69	54	452
Total sheep fattened	534	966	174	452	2,126
Mean number of sheep fattened	0.6	0.8	0.8	0.8	0.7

Similar to the length of cattle fattening, the length of sheep fattening days ranges from 30 to 365 days and on average sheep fattening took 138.4 days. Regionally, in Amhara it was 159.38, in Oromia it was 115.78, in SNNPR it was 116.9 and in Tigray it was 140.37 days. The frequency of sheep fattening also ranges from one to four with the majority (65 percent) only fattening once per year. Goat fattening appeared not to be a common practice in the study areas as only 3.8 percent of respondents reported to have fattened goats. Due to the small number of cases, the details of goat fattening are not presented here.

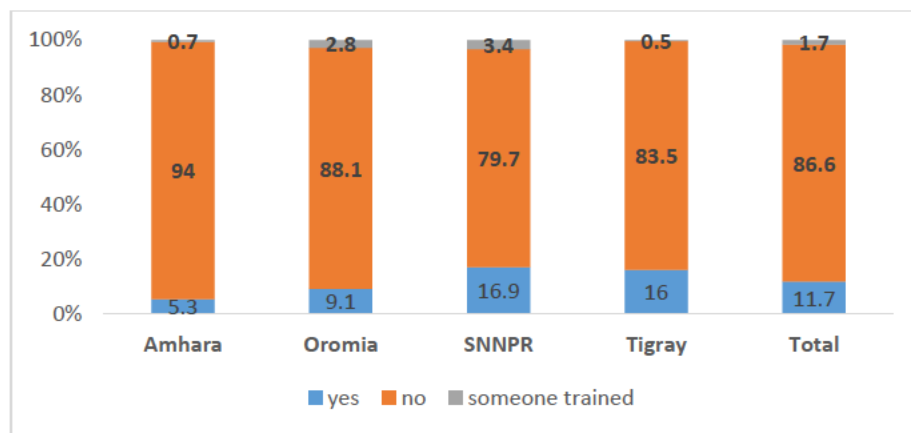
3.4.3 Feed for Fattened Animals and Training on Fattening Management

Households involved in fattening activities were asked if they have fed their animals to be fattened with the types of feed listed in Table 3.24 below. The summary results by region show that the vast majority (93 percent) fed their fattened animals crop residues. Eighty-six percent of respondents also fed their fattened animals green forage. Forty-two percent fed their animals to be fattened agro-industrial byproducts while only six percent fed them factory formulated concentrates. Regionally the feed usage pattern is the same in that the main sources of feed for fattening animals are crop residues and green forage.

27: Table 3.24 Percentage of Households Involved in Fattening by Types of Feed They Provided to Fattened Animals and Region

Feed Types	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
Concentrates (factory formulated & mixed)	3.7	8.5	9.1	2.7	6.3
Agroindustry by-products (wheat bran, oilseed cake, molasses, brewers grain, etc)	19.8	62.7	50.3	31.9	42.1
Other high quality feed (atela, grains)	94.5	68.7	54.5	70.9	74.0
Green forage, grass, hay, silage	91.8	75.6	96.1	80.8	86.0
Crop residue (teff straw, wheat straw, maize stover)	89.9	94.5	93.3	96.8	93.1

In relation to training on fattening management, the majority (87 percent) of respondents reported that they did not receive training. In SNNPR and Tigray, only 16 percent of respondents received training while in Amhara and Oromia the percent of trained households is very small at 5.3 and 9.1 percent, respectively.



10: Figure 10: Percentage Distribution of training on fattening management

Information obtained through focus group discussions indicated that fattening is an activity mainly carried out by rich people and only a few respondents are involved in specialized fattening of cattle and/or sheep. They indicated fattening demands capital due to the high cost of feed and the cattle to be fattened. They further explained that local animal fattening and selling during holidays is a traditional practice by almost all livestock farmers in all regions. Farmers keep old oxen or cows and small sheep for 5-6 months and sell them even before the animals are really fattened. The length of fattening (number of days/months) is usually the determining factor to sell rather than weight of fattened animals.

3.5 Poultry

In section 3.2.3 we presented information on the chicken population and holdings in the study area. This section presents chicken by type, productivity and management type.

3.5.1 Chicken by Type

Section 4 of the household questionnaire collected information on egg laying hens, pullets, male chickens over 3 months and chicks up to 3 months of age by breed types. Table 3.25 and Table 3.26 present the summary of the findings. As shown in Table 3.25 below, overall local hen egg layer holdings are 63 percent while local pullet holding is 29.4 percent. Average local egg laying hen holding among respondents across the study area is 2.2 hens. Regionally among respondents it ranges from 1.6 hens in SNNPR to 2.9 in Oromia. Average local pullet holding among respondents is highest in Amhara and lowest in Tigray.

Local male chicken holding stands at 36 percent across the study areas with average holding among respondents of 1.1 male chickens. Regionally, holding among respondents is highest in Oromia and lowest in SNNPR.

28: Table 3.25: Total and Average Number of Local Chickens by Types and Region

Chicken Types	Amhara	Oromia	SNNPR	Tigray	Total
Total egg laying local hens	1,018	1,392	781	1,049	4,240
Mean egg laying local hens/HH	3.32	4.24	2.84	3.59	3.53
Total no. of HHs with egg laying local hens	307	328	275	292	1,202 (63%)
Total HHs (n)	478	480	477	479	1,914
Number of local egg laying hens/year/HH	2.1	2.9	1.6	2.2	2.2
Total number of local pullets	730	544	647	420	2,341
Number of local pullets/year/HH	1.5	1.1	1.4	0.9	1.2
HHs with local pullets	128	151	167	116	562 (29.4%)
Total number of local male chickens over 3 months of age	590	631	565	362	2,148
Number of local male chickens over 3 months of age/year/HH	1.2	1.3	1.2	0.8	1.1
HHs holding local male chickens over 3 months of age	147	202	186	150	685 (36%)

Table 3.26 below presents the numbers of egg laying, improved hens, improved pullets and improved male chickens over 3 years of age. Overall, out of the total interviewed households, only 22 percent reported holding improved egg laying hens. Regionally, holding of improved laying hens ranged from 31 percent in Tigray to 18 percent in SNNPR. The average holding size of improved egg laying hens was very limited among respondents, ranging from only 0.6 in Amhara to 1 in Tigray.

29: Table 3.26: Total and average number of improved chickens by type and region

Chicken Type	Amhara	Oromia	SNNPR	Tigray	Total
Total egg laying improved hens	284	331	364	502	1481
Number of egg laying improved hens/year/HH	0.6	0.7	0.8	1.0	0.8
Total No. of households with egg laying improved hens	92 (19.2%)	92 (19%)	85 (17.8%)	149 (31.1%)	418 (22%)
Total number of improved pullets	218	90	182	240	730
Number of improved pullets/year/HH	0.5	0.2	0.4	0.5	0.4
HHs with improved pullets	56	25	57	62	200
Total number of improved male chicken over 3 months of age	279	79	223	195	776
Number of improved male chickens over 3 months of age/year/HH	0.6	0.2	0.5	0.4	0.4
HHs with improved male chickens over 3 months of age	57	24	50	64	195

As to improved pullet holding, the overall number per year per household is only 0.4. The number of improved male chickens (over three years of age) holding among respondents across the study area is a tiny 0.4 chickens, ranging from 0.6 in Amhara to 0.2 in Oromia.

3.5.2 Egg Production

Information on egg production was collected by asking respondents to report on the average egg production per clutch, estimating the average number of clutches and then determining the total annual egg production per local hen. For improved hens, direct total annual egg production was asked. Though efforts were made to help respondents understand that the number of eggs produced per clutch and the number of clutches per year were what was needed for the survey, information collection on egg production was challenging. In some study areas, just total egg production was asked both for local hen and improved hens, and in some areas, number of clutches and number of eggs per clutch were asked to estimate the total annual egg production. This difference required auditing egg production data, however, it is hoped that the summary presented in Table 3.25 gives important information for the project.

As presented in Table 3.27 below, overall average annual egg production for local hens was 64 eggs while for improved it was 187.5 eggs.

30: Table 3.27 Total and Average Egg production by Breeds and Region

Egg producing hens	Amhara	Oromia	SNNPR	Tigray	Total
Total egg laying local hens	1,018	1,392	781	1,049	4,240
Mean egg production per year/local hen	66.2	66.1	62.5	62.5	64.4
Total egg laying improved hens	284	331	364	502	1,481
Mean egg production per year/improved hen	183.02	182.6	193.9	189.7	187.3

During focus group discussions with communities, respondents indicated that egg production is mainly dependent on feed, particularly for improved hens. As long as they are fed, improved hens continuously lay eggs. Wheat grain is best and community members are waiting for the woreda agricultural office to receive more improved chickens to distribute.

3.5.3 Poultry Management and Training

Poultry management was assessed based on shelter types and feeding arrangements that respondents used for their poultry. Table 3.28 and Table 3.29 below present summary information related to sheltering and feeding of poultry.

Overall, over 48 percent of poultry holders used unconfined shelter whereas only 23 percent used confined shelter at night for their chickens. Chickens that were confined and sheltered full-time were only about 2 percent of the total, while 26 percent of chickens are not sheltered or confined at all. Regionally, poultry sheltering followed a similar pattern where a majority of respondents used unconfined shelter.

31: Table 3.28 Percentage of Chicken Holders by the Type of Housing System

Types of poultry housing system	Amhara	Oromia	SNNPR	Tigray	Total
No housing	31.6	35.3	26.9	11.7	26.4
Shelter but unconfined	58.4	47.9	40.6	46.6	48.5
Shelter and confined at night	10.1	15.1	32.2	36.9	23.4
Confinement and shelter year round	-	1.6	0.3	4.7	1.7
No. of HHs (n)	358	365	335	358	1,416

With regards to the feeding system, as clearly shown in Table 3.29 below, scavenging home grain supplements is the dominant feeding system (85 percent). Full feeding with home grown grains as well as full feeding with manufactured feed are almost negligible among respondents.

32: Table 3.29 Percentage of Chicken Holders using Different Types of Feeding Systems

Poultry Feeding system	Amhara	Oromia	SNNPR	Tigray	Total
Scavenging	7.3	8.0	6.0	5.8	6.8
Scavenging with home grain supplements	91.9	88.5	82.7	76.7	85.0
Scavenging with concentrated feed supplements	0.8	3.0	9.9	7.8	5.3
Full feeding with home grown grains	-	-	1.5	9.4	2.8
Full feeding with manufactured feed	-	0.5	-	0.3	0.2
No. HHs (n)	358	364	335	360	1,417

Similar to training on dairy animal nutrition and fattening management, training on poultry nutrition and feeding is minimal, with 90 percent of respondents having received no training. In the presence of kebele level development agents who are supposed to train and educate farmers in the agricultural activities and establish farmer training centers in almost every kebele, the reported training level is unexpectedly low. This low level may be due to expectations for training from the FEED II Project.

33: Table 3.30 Percentage of Respondents who Attended Training on Poultry Nutrition and Feeding

Training on Poultry Nutrition and Feeding	Amhara	Oromia	SNNPR	Tigray	Total
Yes	4.4	4.5	12.6	9.3	7.7
No	94.5	93.5	83.0	88.9	90.0
No, but someone else trained in the HH	1.1	2.0	4.4	1.9	2.3
No. of HHs (n)	455	356	405	431	1,647

3.5.4 Gender Involvement in Poultry Related Activities

From Table 3.31 below, it appears that poultry related activities are the main responsibilities of adult women with little support from men or children. They are highly involved not only in cleaning, feeding and watering of chickens, they are also involved in selling of chickens and eggs. The distribution pattern is the same across the study areas and regions.

In one of the focus group discussions in Amhara, a man said that traditionally, poultry is the activity of women, as it is near home and the money is to cover small household expenses and cosmetics, but he also indicated that this time “if poultry will be big money, men also want to become involved”.

34: Table 3.31 Percentage of persons mainly responsible for poultry related activities

Poultry Activities	Amhara	Oromia	SNNPR	Tigray	Total
Chicken house cleaning					
Adult women	66.6	80.9	63.2	90.9	75.7
Adult men	3.7	1.7	9.9	5.8	5.2
Adult women & men	1.4	4.2	11.4	0.3	4.2
equally	28.3	13.3	15.6	3.0	15.0
Children < 18 years	100	100	100	100	100
Total					
Chicken feeding & watering					
Adult women	73.0	76.6	56.9	96.1	76.0
Adult men	5.3	2.5	13.8	3.0	6.0
Adult women & men	4.7	9.9	18.6	0.3	8.2
equally	17.0	11.0	10.8	0.6	9.8
Children < 18 years	100	100	100	100	100
Total					
Chicken & egg selling					
Adult women	77.7	90.8	75.1	95.5	85.2
Adult men	5.4	1.1	11.7	1.4	4.7
Adult women & men	4.9	3.9	6.8	0.8	4.0
equally	12.0	4.2	6.5	2.2	6.2
Children < 18 years	100	100	100	100	100
Total					

3.6 Forage

3.6.1 Forage Cultivation and Sources of Livestock Feed

Forage development is one of the focuses of the FEED II Project. To understand the current cultivation practices and forage strategy used, information on forage was collected through section five of the household questionnaire. Table 3.32 below presents forage cultivation status in the last year.

35: Table 3.32: Percentage of households practiced forage cultivation, strategy used and size of land covered

Forage Cultivated	Amhara	Oromia	SNNPR	Tigray	Total
Yes	37.2	26.2	38.6	17.5	29.9
No	62.8	73.8	61.4	82.5	70.1
Total (n)	478	480	477	479	1,914
Cultivation Strategy					
Oversowing	5.9	6.9	7.1	2.9	5.7
Undersowing	7.3	10.6	8.0	5.8	7.9
Along terrace	19.5	10.6	29.1	9.4	17.1
Average land size	142.1 m ²	124.1 m ²	79.7m ²	58.8 m ²	101.2m ²

Overall only 30 percent of the interviewed households reported that they have cultivated forage in the year preceding the survey. SNNPR and Amhara reported higher percentage of households involved in the cultivation forage at 38.6 and 37.2 percent, respectively, than Oromia and Tigray. Average land size covered by forage is wider in Amhara and Oromia at 142 and 124 m² respectively, than Tigray and SNNPR. Forage producers cultivated different sized parcels of land for forage production, ranging from a fraction of m² to 5,000m², with the overall average being 101.2m². Forage strip along the terrace borders and under sowing were the two widely used strategies in all regions. A few households used the two strategies together.

Those who cultivated forage in the last year were asked if they used improved forage planting materials, including improved seeds, seedlings, cuttings, splits, and others. The findings are summarized in Table 3.33 below. Overall 24 percent of respondents reported that they used one or two of the listed improved forage planting materials. The sources for these improved forage planting materials were government (17.6 percent), other farmers (8.4 percent), purchases from private venders (2.9 percent), and NGOs (2.2 percent).

36: Table 3.33: Percentage of households by Use of improved forage planting materials and Sources of Planting Materials

Improved Forage Planting Materials use	Amhara	Oromia	SNNPR	Tigray	Total
Yes	32.8	20.0	31.7	12.3	24.2
No	4.4	6.2	6.9	5.2	5.7
No forage cultivation done	62.8	73.8	61.4	82.5	70.1
Total (n)	478	480	477	479	1914
Sources of Improved Materials					
Government	17.8	14.6	26.0	12.1	17.6
NGO	1.3	0.6	5.0	1.9	2.2
Purchased from private vender	0.6	7.9	2.9	0.2	2.9
Farmer exchange	16.3	5.8	10.9	0.4	8.4

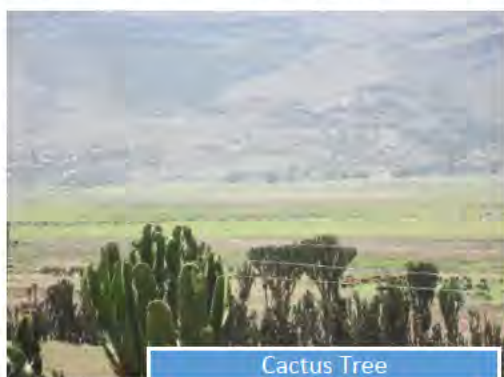
Use of improved forage planting materials in relation to forage cultivation is very high in all regions as 32.8, 20.0, 31.7 and 12.3 percent of surveyed households in Amhara, SNNPR, Oromia, and

Tigray, respectively, indicate they used them. Government and farmer exchanges were equally the main sources of improved forage planting materials in Amhara. In Oromia forage cultivators accessed their improved forage planting materials from government, purchases from private vendors, farmers exchange and NGO in order of importance. In Oromia, forage seeds sourcing through purchase from private vendor are the largest while the share of NGO is the smallest than the other three regions. In Tigray, Government was almost the sole provider of improved forage planting materials. Overall, Government played a major role in the provision of improved forage planting materials for those surveyed.

From Table 3.32 and Table 3.33 above, it is apparent that forage cultivation is not that major of an activity as only 30 percent of the interviewed households cultivated forage last year. However, the use of improved forage planting materials among these forage producers was high, and the role of government in supplying these materials was also quite remarkable.

Discussions were held with communities and woreda livestock offices about the sources of animal feed and forage production. Information from the discussions indicated that farmers have little land to devote to cultivating forage for their animals. According to respondents human population growth demands increasing use of the available land for crop production while crop residues and hay are generally used for animal feed across the regions. Hence, integrating food crops with forage crops production seems to be better ideas for our project beneficiaries to be advised and technicality assisted. Other supplementary feeds given to animals vary depending on the types of vegetables, fruits or other plants grown in the regions.

In Tigray, it was explained that cactus is the main source of feed after crop residues and hay. Respondents in Tigray indicated that most lands there are rain-fed and pasture is available only during rainy season. During dry season, the only source of animal feed is cactus. Cactus block is



being produced and distributed to farmers by the woreda agriculture office as a pilot in Tsega kebele of Raya Azebo woreda. On the other hand, kebele development agents said that though cactus is being used as source of feed, recently it has been affected by an unknown disease, decreasing its availability and frustrating communities' efforts to properly nourish their animals. However, the planting of green forage also has been introduced, though, dependency on rain fed agriculture and extended drought in the region reported to undermine the improved forage production efforts of the farmers. In order to overcome this problem, Tigray region respondents suggested the project should facilitate provision of water harvesting scheme, improved forage seeds such as alfalfa and training the community members.

The Tigray woreda livestock offices also explained that some normally closed land areas are provided to youth groups mainly for forage production as income generation activities. Hence, if these groups are supported with training and other technical follow-up, they will produce better quality forage for the communities at a fair price.



Forage Plantation in Gusha Shunkurta Kebele, Amhara Region

In Amhara, respondents indicated the sources of feed are natural grazing, crop residues, bi-products of local breweries and cultivated forage trees such as sesbania and treelucern from the backyard and bund terraces as cut and carry. The data collection team observed the plantation and growth of forage across the border of the crop land in Gusha Shunkurta kebele of Gagusa woreda. Respondents explained that the kebele is known for its forage plantation and a model site for experience sharing from different woredas of the region and other regions.

In SNNPR, the sources of feed varied widely depending on the types of crops and plants grown in the different parts of the region. For example, in Wondoget, sugar cane leaves, hay, enset, banana and sweet potato leaves are used while a few people grow improved forage in their backyards. In Damot Gale Woreda, enset leaves, wheat bran and grass are sources of feed. Moreover, farmers planted desho and elephant grasses in their backyards, farm borders, and on terraces, though land shortages are reported as major challenges. In Arbaminch Woreda, it was reported during the discussion that crop residue (maize), grass, banana leaves with setam and broken fruits and atela are the most common sources of animal feed.

In Oromia region, as feed sources vary from place to place. In Gutu Gida Woreda, free grazing is the main source of animal feed. However, farmers are not sure if their livestock are obtaining nutritious and adequate feed. Elephant grass and oats were also introduced in some areas, but very few farmers used improved forage in their livestock feeding regimes. Straw and grazing land as well as crop residues are the major source of livestock feed in and around Dendi Woreda. There are also industrial by-products to purchase in the nearby town, but the price for these is very high. In Woliso Woreda, farmers indicated that grassland, enset, straw and crop residues are the major sources of feed for animals. Byproducts from the local brewery and agro-industrial byproducts such as wheat bran and noug cake are also used by some farmers who are involved in fattening of bulls for profit. Moreover, some farmers started growing vetch and alfalfa which was introduced by the government to the area.

3.6.2 Training on Improved Forage Production

Similar to other livestock management trainings, information on forage development training was collected from interviewed households and the result is summarized in Table 3.34 below. Overall,

training on improved forage production is very low at about 10 percent. Eighty-eight percent of the interviewed households reported that they did not receive any training while about three percent responded that someone in the household received training on improved forage production.

37: Table 3.34: Percentage of households by training on Improved Forage Production

Received training	Amhara	Oromia	SNNPR	Tigray	Total
Yes	4.5	4.5	18.1	10.7	9.6
No	94.6	92.0	76.8	88.2	87.8
Someone from the household trained	0.9	3.5	5.1	1.1	2.7
Total (n)	443	423	452	449	1,767

Regionally, SNNPR is better off than any of the other regions as 18 percent of respondents have received training on forage production. Forage production (Table 3.32) was also better in SNNPR than in other regions and this could be due to better training coverage. In Tigray, 10.7 percent of respondents received forage training, while 4.5 percent of respondents in both Amhara and Oromia regions received it.

3.6.3 Distances to the nearest factory formulated and mixed feed distribution center

The distances to formulated and mixed feed factories and distribution centers is a limiting factor for use or non-use of manufactured feed. As discussed in the above sections, the use of concentrated feed for dairy cows, fattening of livestock and poultry production is very minimal among those surveyed. According to respondents, their limited use was due to the high cost and lack of availability and access to such feed. A key project indicator sets a radius of no more than 16 kms as the cut-off point for the distance from distribution centers to households to ensure households have access to quality manufactured feed.

Information on the current distances to the nearest formulated and mixed feed factories and distribution centers is summarized in Table 3.35 below. In relation to the threshold in the indicator, only 18 percent of respondents currently have the required access to manufactured feed. Over half of the interviewed households do not know where the factory or formulated and mixed feed distribution center is while about 17 percent said there is no distribution center nearby.

38: Table 3.35: Percentage of Households by Distance to Factory Formulated Feeds

Distance to the nearest factory formulated and mixed distribution center	Amhara	Oromia	SNNPR	Tigray	Total
<16 km	15.7	20.9	27.2	9.6	18.2
17-30 km	6.7	1.4	7.8	7.1	5.8
31km & more	6.7	1.9	3.9	6.7	4.9
No distribution centers available	6.5	43.0	9.7	9.6	16.8
I don't know	64.4	32.7	51.4	67.1	54.3
Total (n)	447	416	434	450	1,747

3.7 Income from livestock and livestock products

3.7.1 Number of fattened animals sold and value of sales

Information on the number of fattened oxen/bulls sold and the corresponding value of those sales is presented in Table 3.36 below. This data was collected by asking for the number of fattened animals sold by type and the average unit prices of the sold animals.

As presented in the table, only 28 percent of the interviewed households were engaged in selling fattened oxen/bulls. Respondents sold a total of 1,076 fattened oxen/bulls that had a sales value of over 8 million birr. On average, households were able to earn 4,366 birr from fattened oxen/bull.

At regional level, the percentage of households involved in selling of fattened oxen/bulls ranges from 16 percent in Tigray to 35 percent in Oromia. In terms of the total number of oxen/bulls sold, it ranges from 198 in SNNPR to 362 in Tigray. In Tigray, though, the number of households involved in selling fattened bulls/oxen is small at 77, the value of sales was over 3 million birr with an average proceeds of over 6472.2 per year/household.

39: Table 3.36: Distribution of Households by Number of Fattened Oxen/Bulls Sold and the Value of those Sales

Number of fattened bulls/oxen Sold	Amhara	Oromia	SNNPR	Tigray	Total
None	66.3	65.4	72.3	83.9	72.0
1-2 head	29.5	29.8	24.7	8.6	23.1
3-4 head	2.7	4.6	2.5	3.5	3.3
5-9 head	1.3	0.2	-	1.5	1.1
10+ head	0.2	-	-	1.5	0.4

Total HHs (n)	478	480	477	479	1,914
Number of fattened bull/ox sold	255	261	198	362	1,076
Total birr collected from sale of fattened bulls/oxen	1,538,320	2,373,756	1,344,459	3,100,200	8,356,726
Avg proceeds per household from sale of fattened oxen/bulls (birr)	3,218.2	4,945.3	2,818.6	6,472.2	4,366.1

Table 3.37 below presents information on the value of sales from fattened and sold cows and the number of fattened cows sold. Overall about seven percent of the interviewed households reported selling fattened cows in the last year. In terms of number of cows fattened and sold, overall 6 percent sold 1 to 2 cows and only 0.5 percent sold 3 to 4 cows. In total, respondents sold 1,914 fattened cows and the value of these sales was 940,868 birr. This indicates that on average households obtained 7,588 birr per sale of fattened cow.

Regionally, the percentages of households that sold fattened cows ranged from 9.8 percent in Amhara to 2.7 percent in Tigray. With regards to the number of cows sold by households, 1 to 2 fattened cows were sold by 9.2 percent in Amhara, 6 percent in Oromia, 6.3 percent in SNNPR and 2.1 percent in Tigray. The total value of sales from fattened, sold cows ranges from 182,200 birr in Tigray to 281,198 birr in Amhara, and the average proceeds per household ranges from 380 birr in Tigray to 517 birr in SNNPR.

40: Table 3.37: Distribution of Households by Number of Fattened and Sold Cows and the Corresponding Sales

Number of cows sold	Amhara	Oromia	SNNPR	Tigray	Total
No fattened cow sold	90.2	93.1	93.5	97.3	93.5
1-2	9.2	6.0	6.3	2.1	5.9
3+ fattened cows sold	0.6	0.8	0.2	0.6	0.6
Total HHs (n)	478	480	477	479	1914
Number of fattened cows sold	63	46	43	26	124
Total sales collected (birr)	281,198	230,970	246,500	182,200	940,868
Average earnings per HH from selling fattened cows (birr)	588.3	481.2	516.8	380.4	491.6

Table 3.38 below illustrates the percentages of households that sold fattened sheep and the corresponding value of those sales. Percentages in the table show that about 18 percent of the

interviewed households reported that they had fattened and sold sheep in the last year. In terms of number of sheep fattened and sold, overall, 11.6 percent sold 1 to 4 sheep, 2.9 percent 5 to 9 sheep, and 3.4 percent sold 10 or more sheep. A total of 1,882 fattened sheep were sold for over two million birr. This indicates that on average households received proceeds of 1,101 birr from sales of fattened sheep.

The number of households that sold fattened sheep is much higher than the same figures for cows and bulls/oxen, which may be due to lower costs for fattening sheep.

41: Table 3.38: Distribution of Households by Number of Fattened Sheep Sold and the Corresponding Value of Sales

Number of sheep sold	Amhara	Oromia	SNNPR	Tigray	Total
No sheep sold	76.2	74.8	87.2	90.2	82.1
1-4 fattened sheep sold	18.4	12.5	11.9	3.5	11.6
5-9 fattened sheep sold	2.7	5.0	0.8	2.9	2.9
10+ fattened sheep sold	2.7	7.7	-	3.3	3.4
Total HHs (n)	478	480	477	479	1,914
Number of sheep sold	468	868	128	418	1,882
Total sales collected (birr)	504,271	1,006,961	148,580	448,500	2,108,312
Number of households sold fattened sheep	114	121	61	47	343
Average proceeds per household from selling fattened sheep(birr)	1055.0	2097.8	311.5	936.3	1101.5

Regionally, the percentages of households that sold fattened sheep ranges from 9.8 in Tigray to 25 percent in Oromia. In terms of the number of sheep fattened and sold, 1 to 4 sheep were sold by 18 percent of households in Amhara and only 3.5 percent in Tigray. Five to 9 and 10 and more fattened sheep were sold by smaller percentages of households in each region. This is an illustration that fattening and selling of sheep was done for significantly higher numbers of animals than for cattle.

The sales value from fattened sheep ranges from a bit less than half a million birr in Tigray to over a million birr in Oromia. The average proceeds per household ranges from 311 birr in SNNPR to over one thousand birr in Amhara.

As shown in Table 3.39 below, overall only 4 percent of the interviewed households were involved in selling of fattened goats. A total of 288 fattened goats have been sold with a total value of 271,801 birr, and the average household earned was 142 birr.

42: Table 3.39: Distribution of Households by Number of Fattened Goats Sold and Corresponding Sales

Number of goats sold	Amhara	Oromia	SNNPR	Tigray	Total
No goat sold	98.1	97.5	93.3	95.2	96.0
Households sold fattened goats	1.9	2.5	6.7	4.8	4.0
1-4 fattened goats sold	1.3	2.3	6.3	2.7	3.1
5-9 fattened goats sold	0.6	0.2	0.2	1.5	0.6
10+ fattened goats sold	-	-	0.2	0.6	0.2
Total HHs (n)	478	480	477	479	1,914
Number of goats sold	33	27	87	141	288
Total sales collected (birr)	43,600	26,040	84,434	117,730	271,804
Average proceeds per household from sales of fattened goats	91.2	54.3	177.0	245.8	142.0
Average proceeds per household that sold fattened goats	4,844.4	2,170.0	2,638.56	5,118.69	3,576.37

3.7.2 Quantity of Dairy Products Sold and their Value

Dairy products include milk, butter and cheese. Information on the sales of milk and butter is presented in Tables 3.40 and 3.41 below, respectively. However, information from cheese sales is not presented, as very few households were engaged in the selling of cheese.

As shown in Table 3.40, 19 percent of the interviewed households were involved in selling milk. These households sold 145,773 liters of milk that had a sales value of over one million birr. On average, a household earned 613 birr. If we compare the percentage of households having dairy cows (Table 3.13) with the percentage of households that sold milk, while 79 percent of respondents reported they had dairy cows, only 19 percent were engaged in selling milk. This was discussed during the focus group discussions and participants in Tigray and Amhara indicated that selling milk is not a well-accepted norm in their communities/traditions, but selling butter is more accepted and common.

At regional level, the percentage of households involved in milk selling ranges from 12 percent in Tigray to 36 percent in SNNPR. However, in terms of quantities of milk sold, the smallest was from SNNPR and the highest was from Oromia.

43: Table 3.40: Distribution of Households by Quantity of Milk Sold and the Corresponding Value of Sales from Milk

Amount of milk sold in liter	Amhara	Oromia	SNNPR	Tigray	Total
No milk sold	88.0	84.6	63.6	87.5	81.0
<=1000liter/year	10.7	12.5	36.2	9.0	17.0
> 1000liter/year	1.3	2.9	0.2	3.5	2.0
Total HHs (n)	478	480	477	479	1,914
Liters of milk sold last year	16,950	63101	8477.9	57243	145,773
Total sales collected from milk sale (birr)	91,732	498336	73970.4	504,002	1,168,042
Average proceeds per HH from milk sale	191.9	1038.2	155.1	1052.2	610.3

As illustrated in Table 3.41 below, 33 percent of households sold butter in the last year, which is much higher than the percentage of households that sold milk (19 percent). A total of 11,263 kilograms of butter were sold with a sales value of about 1.3 million birr and an average earning of 667 birr per household.

Regionally, the greatest percentage of respondents that sold butter were in Amhara (39.4 percent) and Tigray (32.2 percent). However, respondents in Oromia and Amhara sold the highest quantity of butter.

44: Table 3.41: Distribution of Households by Quantity of Butter Sold and the Value of sales

Item	Amhara	Oromia	SNNPR	Tigray	Total
No butter sold (% of HHs)	60.6	70.9	68.2	67.8	66.8
<100 kg/year (% of HHs)	37.5	28.0	31.5	32.0	32.3
>100 kg/year (% of HHs)	1.9	1.1	0.2	0.2	0.9
Total HHs (n)	478	480	477	479	1914
Amount of butter sold (kg) last year	3,819.89	3,867.25	1,298.75	2,277.25	11,263.14
Total sales collected from butter sale, birr	419,705.96	437,256.5	153,769.5	266,584	1,277,315.96
Average proceeds per HH from butter sales	878.0	911.0	322.4	556.5	667.4

3.7.3 Sales of Poultry and Poultry Products

Tables 3.42-3.44 below present information on the percentages of households that sold chickens by type (pullets, broilers and spent hens), while Table 3.45 below presents information on numbers of eggs sold and the corresponding sales values.

Overall, 17 percent of households sold pullets, the total number of pullets sold was 4,741 with a sales value of 413,207 birr. On average, households earned 216 birr from selling of pullets. Oromia had the highest number of pullets sold, as one person sold 2,850 pullets. If this individual's pullet sales are excluded, the number of pullets sold by region would be almost equal.

45: Table 3.42: Distribution of Households by Number of Pullets Sold and the Value of Sales

Item	Amhara	Oromia	SNNPR	Tigray	Total
No pullets sold (% of HHs)	85.1	81.5	86.0	79.1	82.9
1-4 pullets sold (% of HHs)	9.0	13.5	10.9	14.4	12.0
5-9 pullets sold (% of HHs)	4.0	4.0	1.9	4.4	3.6
10+ pullets sold (% of HHs)	1.9	1.0	1.3	2.1	1.6
Total HHs (n)	478	480	477	479	1914
Total number of pullets sold last year	387	3181	291	882	4741
Total sales collected from sale of pullets (birr)	24,629.4	270,348	20,089	98,141	413,207
Average proceeds per HH from pullet sales (birr)	51.5	563.2	42.1	204.9	215.9

Note: One individual in Oromia sold 2,850 pullets in the last year.

The percentage of households that sold broilers (23 percent) is higher than the percentage of households that sold pullets (17 percent), but the total number of pullets sold (4,741) was much higher than the total number of broilers sold (1,941). Pullets for egg production are apparently in greater demand than broilers for meat as indicated in Table 3.42 above and Table 3.43 below.

46: Table 3.43: Distribution of Households by Number of Broilers Sold and Value of Sales

Item	Amhara	Oromia	SNNPR	Tigray	Total
No broilers sold (% of HHs)	77.0	79.6	80.3	70.6	76.9
1-4 broilers sold (% of HHs)	16.5	14.6	16.8	22.5	17.6
5-9 broilers sold (% of HHs)	5.2	4.2	1.7	4.2	3.8
10+ broilers sold (% of HHs)	1.3	1.7	1.3	2.7	1.7
Total HHs (n)	478	480	477	479	1914
Total number of broilers sold last year	439	439	292	771	1941
Total sales collected from sale	37,854.3	44,715	27,825	79,699	190,093

of broilers (birr)					
Number of HHs sold broilers	110	98	94	141	443
Average proceeds per HHs from sales of broilers (birr)	79.2	93.2	58.3	166.4	99.3

The percentage of households engaged in selling spent hens is much lower (12.7 percent) than those engaged in selling pullets (173 percent) and broilers (23 percent). Respondents sold a total of 670 spent hens with a sales value of 55,091 birr, showing average proceeds of 29 birr per household.

47: Table 3.44: Distribution of Households by Number of Spent Hens Sold and Value of Sales

Item	Amhara	Oromia	SNNPR	Tigray	Total
No spent hens sold	93.3	84.4	82.0	89.6	87.3
1-4 spent hens sold	5.9	14.0	15.3	7.5	10.7
5-9 spent hens sold	0.6	1.5	2.3	2.3	1.7
10+ spent hens sold	0.2	0.2	0.4	0.6	0.4
Total HHs (n)	478	480	477	479	1914
Total number of spent hens sold last year	82	187	231	170	670
Total sales collected from sale of spent hens (birr)	6,491.0	16,655.7	18,847.0	13,100.75	55,093.8
Average proceeds per HH from spent hen sales (birr)	13.6	34.7	39.5	27.4	28.8

Table 3.45 below illustrates the percentage of households that sold eggs and the corresponding value of those sales. Overall about 51 percent of households were involved in selling eggs last year. The total number of eggs sold was 153,351 with a sales value of 281,802 birr and average proceeds of 147 birr per household.

Regionally, respondents in Tigray are supplying the most eggs to the market while respondents in Oromia are supplying the least. This may be due to higher number of egg laying improved chickens in Tigray (See Table 3.24).

48: Table 3.45: Number of Eggs Sold and Value of Sales from Eggs in the Last Year

Item	Amhara	Oromia	SNNPR	Tigray	Total
HHs that sold eggs last year (%)	56.7	55.4	40.3	49.7	50.5
Number of eggs sold	36,254	24,065	38,375	54,666	153,351
Sale value of eggs	60,405	47,045	74,333.5	100,017	281,801.5
Average proceeds per HH that sold eggs	126.4	98.0	155.8	208.8	147.2

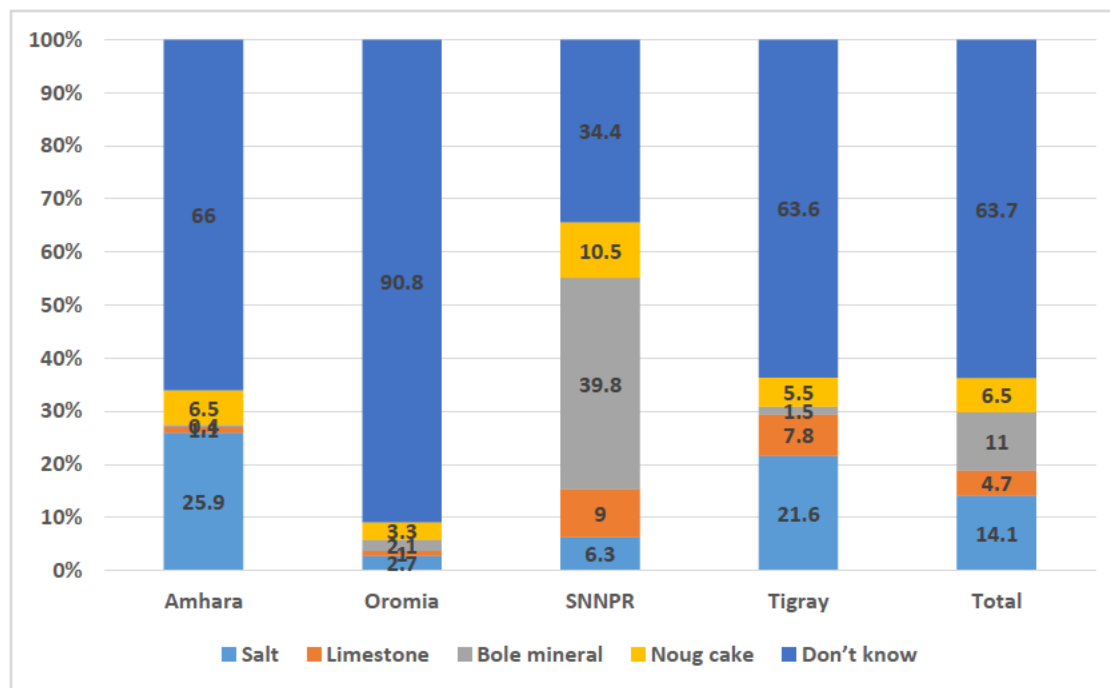
3.7.4 Sales from Forage

Forage has been largely used by farmers to feed their own livestock. Forage sales were limited to only a small percentage of households that sold other than crop residues (6 percent), including hay (1.8 percent), splits (1 percent), cuttings (0.7 percent), green feed (0.4 percent), and seedlings (0.2 percent).

3.8 Knowledge on Animal Nutrition and Use of New Technology

3.8.1 Knowledge on Animal Nutrition

Information related to knowledge on animal nutrition and improved technology and management practices was collected through Sections 7 and 8 of the household questionnaire, respectively. Figure 12 below presents responses on knowledge about how nutritionally balanced, manufactured feeds can reduce the occurrence of milk fever in dairy cows and soft egg shells in poultry. Overall, 64 percent of respondents indicated that they don't know which feeds can reduce milk fever in dairy cows and the occurrence of soft egg shells in poultry. Eleven percent said that bole mineral reduces the occurrence of milk fever and soft egg shells while 6.5 percent said noug cake. The correct answer, limestone, was known to less than 5 percent of overall respondents.



11: Figure 11: Knowledge on feed that can reduce the occurrence of milk fever or soft egg shells

A regional comparison shows that in Oromia 91 percent of respondents do not have any idea what type of feed reduces the incidence of milk fever and soft egg shells. Knowledge of this nutrition fact in SNNPR and Tigray was higher than in other regions, but still quite low at 9 and 8 percent, respectively. Responses to the other nutrition related questions are presented in Tables 3.46 – 3.48.

49: Table 3.46: Response on comparing noug cake and cottonseed for milk production

Feed 1 kg of noug cake per day to a crossbred dairy cow grazing pasture will support the same daily milk production as:					
	Amhara %	Oromia %	SNNPR %	Tigray &	Total %
0.5 kg cottonseed cake	2.0	0.6	11.6	3.0	4.3
1.0 kg cottonseed cake	1.8	0.6	7.5	3.4	3.3
1.2 kg cottonseed cake	0.2	0.4	10.7	3.6	3.7
1.0kg wheat bran	2.0	5.9	24.2	5.3	9.3
Don't know	94.1	92.5	45.9	84.7	79.3
Total (n)	457	478	466	471	1872

50: Table 3.47: Percent response on comparing grass cut 30 days after and 60 days after the last cutting for milk production

In a cut-and-carry system, grass cut 30 days after the last cutting of the same plot can support daily milk production when fed to a crossbred dairy cows as grass cut 60 days after the last cutting					
	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
Same	0.8	-	2.1	1.9	1.2
More	33.7	16.3	36.1	34.3	30.1
Less	19.7	14.0	55.8	19.2	27.2
Don't know	45.8	69.7	6.1	44.6	41.6
Total (n)	472	479	477	475	1903

51: Table 3.48: Response on comparing noug cake and cottonseed for milk production

A dairy cow fed something in combination with elephant grass will produce more milk per day than when fed Elephant grass alone					
	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
Rhodes grass	1.9	1.0	34.3	2.5	10.0
Vetch	4.5	16.3	24.4	14.9	15.1
Teff straw	10.8	12.8	14.1	12.4	12.5
Don't know	82.8	69.9	27.2	70.1	62.5
Total (n)	471	478	475	475	1,899

3.8.2 Business Knowledge

The business knowledge of respondents was assessed using two questions. The first was related to information needed to decide whether the business is making a profit or a loss. This was assessed using the simple example presented in Table 3.49 below. Over 50 percent of respondents said they do not know what information is needed to determine a profit or loss. Fourteen percent said that information on the 'amount of money spent on input and labor to raise the forage and marketing expenses' is required to assess a profit or loss and 10 percent replied that 'price received per bale of forage sold' is enough. Very few said information on 'bale size' and 'number of bales sold' was needed. In general, only 10 percent of respondents knew what information is required to determine if a business made a profit or loss.

52: Table 3.49: Response on information needed to know a profit or loss

If you plant a piece of your farm land to forage which you will later sell as baled hay, what information do you need to collect so that after sale you can know if you made a profit or loss?					
	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
1. Amount of money spent on input and labor to raise the forage and marketing expense	3.2	9.4	32.3	11.8	14.2
2. Price received per bale of forage sold	6.3	7.3	21.3	6.5	10.4
3. Bale size (big or small)	4.7	1.5	2.5	0.8	2.4
4. Number of bales sold	3.8	1.0	1.9	1.7	2.1
5. 1 & 2	1.7	5.0	14.8	17.7	9.8
6. 1, 2 & 4	18.2	7.7	9.7	3.8	9.8
7. Don't know	62.2	68.1	17.5	57.7	51.4
Total (n)	473	479	474	475	1,901

The second question asked to assess business knowledge among respondents was how to make decision in selecting the best business for investment. The comparison provided was ‘investing on raising broiler chickens’ or ‘fattening sheep’. The responses are summarized in Table 3.49. Thirty-three percent of respondents indicated that they do not know on what basis the decision should be made while 17.5 percent answered correctly that you need to ‘compare market price minus input cost for each and choose the larger of the two’. Regionally, in Oromia, 34 percent responded correctly while the corresponding figure in Tigray is only 9 percent.

53: Table 3.50: Response on choice of investing in broiler chicken or fattening sheep

If you have the choice of investing your money in raising broiler chickens or fattening sheep for income, how would you decide which to do?					
	Amhara (%)	Oromia (%)	SNNPR (%)	Tigray (%)	Total (%)
Compare the cost of inputs for each and choose the smaller of the two	9.5	8.6	49.3	23.0	22.6
Compare market prices for each and choose the larger of the two	26.6	18.4	32.1	30.9	27.0
Compare market price minus input cost for each and choose the larger of the two	12.7	34.2	14.6	8.6	17.5
Don't know	29.7	58.5	10.1	33.4	32.9
Total (n)	474	479	477	473	1,903

3.8.2 Technology and Management Practices

Information on improved technology and management practices is displayed in Table 3.51 below. As shown in the table, some technologies are consistently practiced by the respondents such as cut and carry, feeding troughs to feed animals, hay making, providing free access to clean water. On the other hand, improved practices such as ‘recordkeeping’, ‘baling’, ‘urea treatment of crop residues’, ‘supplementation with urea molasses lick blocks’, ‘silage making’, and ‘feeding factory formulated feed’ are at early stages of practice.

54: Table 3.51: Response on use of improved technology and management practices

Do you use any of the following improved practices? Percent “Yes”					
	Amhara	Oromia	SNNPR	Tigray	Total
Cut and carry	84.2	70.	81.6	66.3	75.6
Feeding troughs to feed animals	52.9	58.2	38.1	74.1	55.9
Drinking troughs to provide clean water for animals	42.9	43.7	51.2	60.2	49.3
Rotational grazing	28.2	37.4	48.4	9.9	31.0
Record keeping of any kind	5.7	3.1	6.1	5.5	5.1
Feed a total mixed ration	6.7	20.7	18.3	19.3	16.3
Forage chopping	36.0	44.8	66.1	41.1	47.0
Baling	4.0	0.6	39.5	9.1	13.3
Supplementation of crop residues with green fodder	22.9	18.8	53.3	42.7	34.4
Urea treatment of crop residues	2.7	1.5	12.8	5.9	5.7
Supplementation with urea molasses lick blocks	2.1	2.1	4.0	4.0	3.0
Hay making	78.5	69.7	66.9	73.0	72.0
Silage making	1.1	1.7	7.6	1.7	3.0
Do you feed factory formulated feed?	3.6	4.4	10.8	4.6	5.8
Provide free choice access to clean water	61.9	44.3	66.5	80.5	63.3

IV. Indicators: Benchmarks, Refinements and Clarifications

Baseline benchmark values for outcome indicators and intermediate results are presented in Tables 4.1 and 4.2 below. The survey results do not provide evidence that would suggest that the target 15 percent increase is unreasonable or unachievable for any of the outcome indicators. As a result, no changes are proposed. However, the definitions of four outcome indicators, i.e. Outcome 1/Indicators 1 and 2 and Outcome 2/Indicators 1 and 2, need refinements and clarification.

It was noted from the survey results that respondents apparently considered any “feeding” of animals that would ultimately be sold for meat qualified as “fattening.” Answers to the question regarding number of days required to fatten an animal ranged from a minimum of 30 days to as much as 365 days. An animal cannot be fattened in 30 days even when fed a very high energy, high quality fattening diet. Likewise, any animal that is kept for as much as a year before sale is not being

fattened. Such a management practice is, in fact, more akin to scavenging poultry production where the main objective is for the animal to utilize low value resources that would otherwise go to waste. While this practice does add productivity and efficiency to a farm household, improvements are marginal, it does not produce a fat animal as desired by consumers and does not constitute a fattening enterprise. Such resources are best reserved for e.g. oxen when not plowing or breeding cows when not lactating. In contrast, fattening for the commercial market, whether by smallholders or larger feedlots, typically involves the provision of high energy feeds for a period of 60 – 120 days, with 90 days being a common target. As a result, the definition of “fattened cattle” that should be used for the purpose of benchmarking this indicator is “cattle provided feeds high in energy for a period of 60 – 120 days.” The benchmark value would be expressed as “number of cattle fattened / year/ household. Note, however, that this does not necessarily mean that it is only cattle fattened on smallholder farms. That will undoubtedly be the case for some but for others participation may be through their cooperative, union or other group in which they have membership. The benchmark value included in Table 4.1 is based on this definition.

With respect to poultry, the survey confirmed expectations as well as previous reports by others that holdings in the project’s target population consist largely of local birds. Improved breeds, while growing, are still only about one quarter of the total. Moreover, as was cited in the focus group discussions, local birds may continue to play an important role in some areas for the foreseeable future because of their greater survivability. As a result, growth in smallholder poultry production is likely to depend on local birds, too; not just improved birds. In light of this fact and upon reconsideration, it seems illogical to focus Outcome 1/Indicator 2 only on improved poultry. The indicator has, thus, been revised to reflect all poultry, regardless of breed type (indigenous vs improved) or class (layer vs. broiler, etc.). The premise is that any increase in poultry production per household is exactly that, an increase in poultry production. This revision captures better the intent of this indicator.

During the survey it was found that a significant number of households which milk cows sell milk products such as butter and cheese instead of milk. As a result, to better capture the revenue generated by these products Outcome 2/Indicator 1 has been revised to include “milk products” in the list of marketed outputs.

As for Outcome 2/Indicator 2, for clarification purposes it should be noted that the focus is on commercial enterprises, whether cooperative/union or other group based, which the FEED II project helped establish. Livestock, poultry and forage activities engaged in for profit by participating smallholder farmers will also be monitored but the indicator refers to the commercial enterprises. Moreover, return on investment is not a change from some previous value. Rather, it is a value determined for a given period during the project.

55: Table 4.1: FEED II Outcome Indicators and Baseline Benchmark Values

Outcome-1: Increased Agricultural Productivity		Definition	Baseline Benchmark Values
Indicator-1	15 percent increase in unit productivity of fattened cattle	Percentage increase in productivity of fattened cattle per head over the measured baseline. Unit: Percent	Number of cattle fattened/ year/ 100 HHs: Total = 17.2
Indicator-2	15 percent increase in unit productivity of poultry	Percentage increase in productivity of local and exotic/ improved poultry, by counting the total number of poultry (all types) raised over baseline. Unit: percent	Number of poultry (all types) raised/year/ HH: Total = 7.7
Indicator-3	15 percent increase in unit productivity of milk	This indicator will measure the percentage increase in productivity of milk, by counting kilograms of milk produced and calculating the percentage increase over the measured baseline. Unit: Percent	Average quantity (liters) of milk produced/ milking cow/ day: Indigenous = 1.0 Crossbred = 3.6
Outcome-2: Expanded Trade of Agricultural Products			
Indicator-1	15 percent increase in sales of agricultural products (fattened cattle, poultry, feed, milk/milk products and eggs) by project beneficiaries	This indicator will calculate the gross sales of these five products by beneficiaries at various points over the life of project to compare. Unit: Percent	Sales of indicated products/ year/ HH (birr): Total = ETB 9,744.14
Indicator-2	15% return on investment from livestock feed related activities	This indicator will calculate the change in gross revenues as a percent of expenditures associated with a commercial activity. Unit: Percent	Gross revenue that is 15% greater than expenditures associated with a commercial enterprise.

56: Table 4.2: FEED II Intermediate Results

Intermediate Results	Project Target	Indicator Definition	Baseline Benchmark Value
FFPr 1.1 IR-1.1 Improved Quality of Land and Water Resources			
FFPr-1.1 Indicator-1.1	6,000 hectares of eroded land in target areas made productive by conversion to sustainable forage production	Count the number of hectares of sustainable forage plots that are established as a result of the project. Unit: Hectares	Baseline is 0 (i.e. this measures the results of activities to be implemented during the project).
FFPr 1.2 IR-1.2 Increased Use of Improved Agricultural Techniques and Technologies			
FFPr-1.2 Indicator-1	18,524 (70% of 26,463 trained) farmers have applied new techniques or technologies introduced by the project	Count those farmers who have applied the following techniques and technologies defined as: 1) Improved forage growing systems, 2) Increased use of manufactured feed, 3) Improved feedlot, dairy, poultry production practices. "Application" will be assessed through a survey.	Baseline is 0 (i.e. this measures adoption of practices addressed in trainings yet to be conducted).
FFPr 1.2 Indicator-2	62 cooperative and union based enterprises who have applied new techniques or technologies introduced by the project.	Count those cooperatives & unions who have applied the following techniques and technologies defined as: 1) Improved forage growing systems, 2) Increased use of manufactured feed, 3) Improved feedlot, dairy, poultry production practices. "Application" will be assessed through a survey. Unit: Number	Baseline is 0 (i.e. this measures adoption of practices addressed in trainings yet to be conducted).
FFPr 1.3 IR-1.3 Improved Farm Management (Operational, Financial)			
FFPr 1.3 Indicator-1	15,878 farmers have applied improved farm management practices	This indicator will estimate through a representative sample the number of project farmers who have applied improved farm management practices. Unit: Number	Baseline is 0 (i.e. this measures adoption of practices addressed in trainings yet to be conducted).
FFPr 1.3 Indicator-2	62 cooperative and union based enterprises applied improved farm	This indicator will count the number of cooperatives and unions who have applied	Baseline is 0 (i.e. this measures adoption of practices addressed in

	management practices	improved farm management practices. Unit: Number	trainings yet to be conducted).
FFPr 2.3.2 IR-2.1 Improved Management of Buyer/Seller Groups within Trade Sector (Intermediate Result)			
FFPr 2.3.2 Indicator	62 union and cooperative based enterprises applied improved management practices promoted by the project	This indicator will count the number of unions and cooperatives that have applied improved management practices such as record keeping, business planning among others. Unit: Number	Baseline is 0 (i.e. this measures adoption of practices addressed in trainings yet to be conducted).

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Annex I

Baseline Study Design and Methodology

As proposed in the FEED II evaluation plan, FEED II baseline utilized a non-experimental pre/post-test evaluation design with follow-up. We have four regional reporting domains and hence, the baseline survey was done independently in each region. The survey employed both quantitative and qualitative data collection methodologies. For quantitative data collection, a household survey was employed. The sample size was determined in such a way that it enables generalize the findings to the targeted population. For qualitative information, focus group discussions and observation was used. But, qualitative studies was carried out in a subset of kebeles sampled for quantitative survey.

The Study Population:

As the overall goal of the project is to increase the incomes of smallholder livestock producers by improving access to, and use of, consistent, affordable, high quality animal feed that can support greater livestock productivity and efficiency, the study population for this particular baseline study was smallholder livestock producers. The majority of farmers in the targeted project woredas are smallholders.

In addition to smallholder livestock households, cooperatives will also be targeted by the survey to establish a baseline value. Some of the indicators in FEED II performance monitoring plan are targeting cooperatives, so in relation to the indicators, separate assessment will be made for cooperatives.

Sample Size Determination:

During sample size determination, we need to examine the nature of our main measurement variable (continuous or categorical). FEED II assumed that Livestock productivity as measured by income from livestock products is a function of use of improved technologies. Indirectly FEED II hypothesizes that, income from livestock depends on use and non-use of improved new technologies introduced by the project. This shows that the dependent continuous variable (income) is dependent on a categorical variable (use or non-use of improved technologies).

FEED II, also assumes that 70% (Source: Feed II Proposal) of targeted direct beneficiaries will adopt improved agricultural technologies such as improved forage-growing systems, increased use of manufactured feed, improved feedlot, dairy and poultry production practices. The project aims to reach 26, 463 direct and over 160,280 in direct beneficiaries.

In sample size determination, we need also to consider the margin of error that we will accept usually not more than 5%. At 95% confidence level, the sample size for the baseline is estimated using Cochran's general formula as:

$$n = [Z^2 \times PQ / e^2] \times \text{design effect}$$

Where n is the estimated sample size

Z= 1.96 from a standard distribution table at 95% confidence level

P= proportion of beneficiaries expected to adopt the new agricultural technologies (0.7)

Q= 1-P (those who will not adopt the new agricultural technologies) (0.3)

e = the level of error term which we are going to accept/tolerable (0.05 or 5%)

Design effect: the baseline survey will not use simple random sampling; rather it will apply a multi stage sampling technique. It is a ratio of variance using a given sample design to the ratio of variance assuming simple random sampling and applied as an adjustment factor, 1.3

Substituting for the above values in the formula:

$$n = [1.96^2 \times (0.7) (0.3) / 0.05^2] \times 1.3 = 420$$

Assuming that all small-holder farmers will not be available during the survey, sampling with replacement will be done for 10%. So, this will increase the sample size to 462 SHFs per region. The survey will interview a total of $4 \times 462 = 1848$ smallholder farmers in the four regions. Since one person will be interviewed from each household, this indicates a total of 1848 persons will be participated in the HH survey, which is greater than 5% of the direct beneficiaries.

The allocation of sample size into woredas will be as follows:

Table 1: Sample size by Woreda and Kebele:

Region	No of Woredas to be covered	No of Kebeles per woreda	Total Kebeles to be covered	No of HHs to be interviewed in each Kebele	Total Number of HHs for interview
Amhara	8	4	32	15HHs	462
Oromia	8	4	32	15HHs	462
SNNPR	8	4	32	15HHs	462
Tigray	8	4	32	15HHs	462
Total	32		128		1848

This shows that out of the total 39 Feed II Woredas, 32 of them will be covered in the survey.

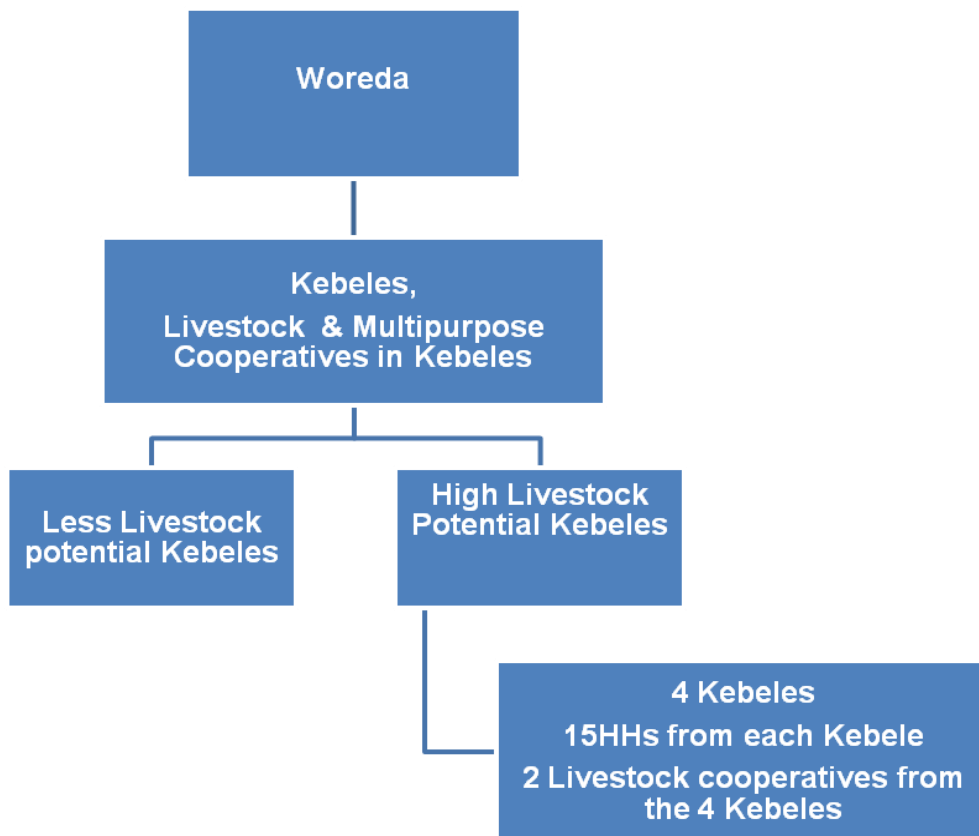
Sampling Procedure:

Considering the objective of the project, the ultimate target population from which the survey collects information is Smallholder livestock Farmers (SHFs). To reach to these ultimate targets, a three stage sampling methodology is proposed. Including FEED I union affiliated woredas, FEED II operational woredas are 39. Of these woredas, 32 were selected (8 per region). Such high coverage

of woredas (82%) was due to varied characteristics of woredas in relation to the types of cooperatives and their potential for livestock production. Hence, the selection of woredas considered the geographical disparity as well as the types of cooperatives in each woreda.

As second stage of sampling, kebeles within the selected woredas were selected. The selection of kebeles has given major emphasis to high livestock potential kebeles.

As a third stage sampling procedure, within the selected kebeles, smallholder farmers/households were selected using systematic random sampling technique. It was assumed that cooperatives (livestock or multipurpose) operational in each kebele have a list of their members and this list was to serve as a sampling frame to identify households for the interview. However, in some kebeles, the list of cooperative members was absent or incomplete, hence, kebele administration list was used as an alternative sampling frame and a systematic random sampling method was applied to identify households for the interview.



Kebele and HH selection within Woreda

Side by side with the HH interview, two cooperatives were assessed from each woreda using cooperative questionnaire. The selection of cooperatives for the study gave major emphasis again to livestock cooperatives, but livestock cooperatives were very small in number. In the absence of livestock cooperatives, multipurpose cooperatives were considered.

Annex II - Household Questionnaire



FEED II Project Baseline Study Household Survey Questionnaire

Interview cover sheet and respondent's informed consent control

Questionnaire Number _____ **(To be filled in the Office)**

Inclusion Criteria:

Interview only Households with Livestock

INFORMED CONSENT (READ THE INFORMED CONSENT TO THE RESPONDENT)

My Name is: _____ I have been commissioned by ACDI/VOCA FEED II project to carry out a HOUSEHOLD SURVEY. The objective of FEED II project is increasing productivity of livestock farmers through creating access to commercial feed manufacturing, improve forage and feeding practice. The purpose of this survey is to give FEED II Project with pertinent information related to livestock/poultry production and productivity including technology and management practices as well as forage production. This information will help the project plan how to support livestock farmers in this kebele and other kebeles of the woreda.

You have been randomly selected among many other households of the kebele as a respondent to this survey. The information you will provide will remain confidential and will only be used for the purpose of the survey only. Your participation in this survey is voluntary and your identity will also remain anonymous. I hope this will be okay with you. However, if you do not feel comfortable participating in the survey, please feel free to say no. This interview will take about 1 hour of your time. Are you willing to participate in this survey? (Circle yes or no)

1. Yes 2. No

(Note to enumerator: If yes, say thank you and continue. If no, go to the next selected HH)

Name of Interviewer	Date of Interview	Signature
Supervisor's comment on the questionnaire	Completed <input type="checkbox"/>	Revisited & checked <input type="checkbox"/>
Name and signature of the supervisor	Date	



FEED II Project Baseline Study
Household Survey Questionnaire

Section 0: Area Identification and Socio-Demographics of HH Head

Region	Zone	Woreda	Kebele	Head of the HH 1= Male 2= Female	Age of Household head 1=< 30 years 2= 30- 40years 3= 41- 50 years 4= over 50 years	Educational Status of Head 1= None 2= None(Read & Write) 3= Primary 4= Secondary 5= Above secondary
Respondent 1= Male 2= Female		Family-Size____ Male____ Female____		Membership status 1= Member 2= Non Member		Coop type: 1= livestock 2= M-purpose 3= Both
Cooperative/s Name in which the HH is a member: 1. _____ 2. _____						

Section 1: Composition of livestock Population in the HH

S.No	Questions	Responses			
101.	Maximum number of each livestock type in possession at any point in time during the last 12 months (one year)				
101A.	Category	101B. Code	101C. Indigenous	101D. Crossbreed	101E. Total
	Mature Cow	01			
	Mature Bull/Ox (> 2 years)	02			
	Heifers (6 months to first calf)	03			
	Male cattle (6 months to 2 years)	04			
	Calf (any sex < 6 months)	05			
	Sheep	06			

S.No	Questions				Responses
	Goats	07			
	Chicken	08			
	Horses	09			
	Mules	10			
	Donkeys	11			
	Others (specify.....)	12			

Note: Mature cow is defined as any female cattle that has had at least one calf

Section 2: Dairy Productivity

S.No	Questions		Response
200	Do you have dairy cows? 1= Yes 2=No (If No, Skip to section 3)		<input type="text"/>
201	How many lactating cows did you have in the past 12 months (one year)? (Note: this refers to all cows, both local and cross breed)	Indigenous <input type="text"/>	Crossbreed <input type="text"/>
	201A. What was the maximum amount of milk you collected in one day from all of your cows during the past 12 months (one year)? (liters/day)	<input type="text"/>	
	201B. What was the minimum amount of milk you collected in one day from all of your cows during the past 12 months (one year)? (liters/day)	<input type="text"/>	
	201C. What is the average number of months your dairy cows produced milk (i.e. the typical length of a single lactation)?	Indigenous <input type="text"/>	Crossbreed <input type="text"/>

202	<p>Do you typically feed any of the items listed below to your livestock? (Answer to all that apply.) 1= Yes 2=No</p> <ol style="list-style-type: none"> 1. Concentrates (factory formulated and mixed feed) 2. Agro-industrial by-products (wheat bran, oilseed cake, molasses, brewers grain, etc) 3. Other high quality feeds (atela, grains) 4. Green forage, grass, hay, silage, 5. Crop Residue (teff straw, wheat straw, maize stover) 	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>			
203	<p>Have you received training in dairy animal nutrition and management during the past 12 months (one year)?</p> <p>1= Yes 2= No 3= No, but someone else in this HH has been trained</p>	<input type="text"/>			
204	<p>Who is mainly responsible for doing the following dairy related tasks? (put \checkmark mark in the appropriate box. Note: only one answer per task)</p>				
Task		Adult women	Adult men	Adult women & adult men equally	Children < 18 age
A. Cleaning the cows' house					
B. Feeding the cows					
C. Feed collection					
D. Feed purchasing					
E. Milking					
F. Milk processing (butter, cheese, etc.)					
G. Selling cows and calves					
H. Selling dairy products					

Section 3: Animal Fattening

S.no	Questions	Responses
301	<p>Did you fatten livestock during the past 12 months (one year)? 1= yes 2= No (If yes, continue. If no, skip to section 4.)</p>	<input type="text"/>

302	What kind of animals did you fatten?			
	Kind of Animals	Number fattened during the past 12 months	Cycles of fattening in the past 12 months	Typical length of fattening period for an animal (number of days)
	Cattle			
	Sheep			
	Goats			
303	Do you typically feed any of the items listed below to your fattening animals? (Answer to all that apply.) 1=Yes 2=No 1. Concentrates (factory formulated and mixed feed) 2. Agro-industrial by-products (wheat bran, oil seed cake, molasses, brewers grain, etc.) 3. Other high quality feed (atela, grains) 4. Green forage, grass, hay, silage, 5. Crop Residue (teff straw, wheat straw, maize stover)			<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
304	Have you received training in improved fattening management during the past 12 months (one year)? 1= Yes 2=No 3=No, but someone else in this HH has been trained			<input type="checkbox"/>

Section 4: Poultry Productivity

S.no	Questions	Response																								
401	Did you keep chickens at any time during the past 12 months (one year)? 1= Yes 2= No (If yes, continue. If no, skip to Section 5.)	<input type="checkbox"/>																								
	If yes, how many of the following chicken types?																									
	<table border="1"> <thead> <tr> <th></th> <th>Local</th> <th>Improved</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>A. Hen (laying)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>B. Female Chickens over 3 months of age not laying (Pullet)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>C. Male chickens over 3 months of age</td> <td></td> <td></td> <td></td> </tr> <tr> <td>D. Chicks (up to 3 months of age)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Local	Improved	Total	A. Hen (laying)				B. Female Chickens over 3 months of age not laying (Pullet)				C. Male chickens over 3 months of age				D. Chicks (up to 3 months of age)				Total			
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Total																										
402A	What was the typical total egg production (number of eggs) laid per local hen	<input type="checkbox"/>																								

402B	during the past 12 months (one year)? per clutch & then annual What was the typical egg production (number of eggs) laid per improved hen during the past 12 months (one year)? Note: Egg production is average from all local and improved hens																					
403	What type of poultry housing system do you use for your chickens? 1= No housing 2= Shelter, but unconfined 3= Shelter and confined at night 4= Confinement and sheltered year round	<input type="text"/>																				
404	How do you feed your chickens? 1= Scavenging 2= Scavenging with supplements (home grains) 3= Scavenging with supplements (Commercial feed) 4 = Full feeding with home grown grains 5= Full feeding with manufactured feed	<input type="text"/>																				
405	Did you receive training on improved poultry nutrition and feeding during the past 12 months? 1= Yes 2=No 3= No, but someone else in this HH has been trained	<input type="text"/>																				
406	Who is mainly responsible for doing the following poultry related? (Put <input type="checkbox"/> mark in the appropriate box. Note: only one answer per task)																					
	<table border="1"> <thead> <tr> <th>Task</th> <th>Adult women</th> <th>Adult men</th> <th>Adult women and men equally</th> <th>Children < 18 years</th> </tr> </thead> <tbody> <tr> <td>A. Chicken house cleaning</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>B. Chicken feeding & watering</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>C. Chicken & egg selling</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Task	Adult women	Adult men	Adult women and men equally	Children < 18 years	A. Chicken house cleaning					B. Chicken feeding & watering					C. Chicken & egg selling					
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Section 5 Forage

S.no	Questions	Responses
501	Did you cultivate improved forage during the past 12 months (one year)? 1= Yes 2= No (If yes, continue. If no, skip to Q506.)	<input type="text"/>

502	<p>If you answered yes to question 501, which of the following strategies did you use? (Answer to all that apply) 1=Yes 2=No</p> <table border="1"> <thead> <tr> <th>Sources</th> <th>1= Yes, 2= No</th> </tr> </thead> <tbody> <tr> <td>1 = Oversowing</td> <td></td> </tr> <tr> <td>2= Undersowing</td> <td></td> </tr> <tr> <td>3= Along the terrace/boarder</td> <td></td> </tr> <tr> <td>4= Others (Specify)_____</td> <td></td> </tr> </tbody> </table>	Sources	1= Yes, 2= No	1 = Oversowing		2= Undersowing		3= Along the terrace/boarder		4= Others (Specify)_____				
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503	<p>What was the total size of land (m²) used for forage production during the past 12 months (one year)?</p>	<input type="text"/>												
504	<p>Did you use improved forage planting materials (seeds, seedlings, cuttings, splits, etc) during the past 12 months (one year)?</p> <p>1= yes 2= No (If yes, continue. If no, skip to question 506.)</p>	<input type="text"/>												
505	<p>If yes, from which sources did you get these improved forage planting materials?</p> <table border="1"> <thead> <tr> <th>Sources</th> <th>1= Yes, 2= No</th> </tr> </thead> <tbody> <tr> <td>1= Government</td> <td></td> </tr> <tr> <td>2= NGO</td> <td></td> </tr> <tr> <td>3= Purchased from private vendor</td> <td></td> </tr> <tr> <td>4= Farmer to farmer exchange</td> <td></td> </tr> <tr> <td>5= Others (specify)_____</td> <td></td> </tr> </tbody> </table>	Sources	1= Yes, 2= No	1= Government		2= NGO		3= Purchased from private vendor		4= Farmer to farmer exchange		5= Others (specify)_____		
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506	<p>Did you receive training in improved forage production during the past 12 months (one year)?</p> <p>1=Yes 2=No 3=No, but someone else in this HH has been trained</p>	<input type="text"/>												
507	<p>How far is the nearest distribution point for factory formulated and mixed feed?</p> <p>1= <16km 3= 31km or more</p> <p>2= 17-30km 4= No distribution point in the area 5= I do not know</p>	<input type="text"/>												

Section 6: Sales from Livestock, Livestock Products and Forage Products:

<u>S.No</u>	Questions	Responses
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601	<p>If you answered “yes” to question 301, how many fattened animals did you sell during the past 12 months (one year) and what were their sale prices?</p> <table border="1" data-bbox="305 289 1247 527"> <thead> <tr> <th>Type of animal fattened</th> <th>Number Sold</th> <th>Average unit price</th> </tr> </thead> <tbody> <tr> <td>Fattened ox/bull</td> <td></td> <td></td> </tr> <tr> <td>Fattened cow</td> <td></td> <td></td> </tr> <tr> <td>Sheep</td> <td></td> <td></td> </tr> <tr> <td>Goats</td> <td></td> <td></td> </tr> </tbody> </table>	Type of animal fattened	Number Sold	Average unit price	Fattened ox/bull			Fattened cow			Sheep			Goats															
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602	<p>How much of the following dairy products did you sell during the last 12 months (one year) and what was the sale price for each? Note: If the answer is “none”, enter “0”.</p> <table border="1" data-bbox="305 632 1279 898"> <thead> <tr> <th>If yes, types of dairy products</th> <th>Amount</th> <th>Average unit price</th> </tr> </thead> <tbody> <tr> <td>A. Milk (liter/month)</td> <td></td> <td></td> </tr> <tr> <td>B. Butter (kg)</td> <td></td> <td></td> </tr> <tr> <td>C. Cheese (kg)</td> <td></td> <td></td> </tr> <tr> <td>D. Others (specify)</td> <td></td> <td></td> </tr> </tbody> </table>	If yes, types of dairy products	Amount	Average unit price	A. Milk (liter/month)			B. Butter (kg)			C. Cheese (kg)			D. Others (specify)															
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603	<p>How much (or how many) of the following poultry and/or poultry products have you sold during the past 12 months (one year)? Note: If the answer is “none”, enter “0”.</p> <table border="1" data-bbox="305 1052 1219 1335"> <thead> <tr> <th>Poultry/products type</th> <th>Number sold</th> <th>Average unit price</th> </tr> </thead> <tbody> <tr> <td>A. Pullets</td> <td></td> <td></td> </tr> <tr> <td>B. Broilers</td> <td></td> <td></td> </tr> <tr> <td>C. Old hens</td> <td></td> <td></td> </tr> <tr> <td>D. Eggs (average/month)</td> <td></td> <td></td> </tr> <tr> <td>E. Chicks</td> <td></td> <td></td> </tr> </tbody> </table>	Poultry/products type	Number sold	Average unit price	A. Pullets			B. Broilers			C. Old hens			D. Eggs (average/month)			E. Chicks												
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604	<p>How much (or how many) of the forage products have you sold in the past 12 months (one year)? Note: If the answer is “none”, enter “0”.</p> <table border="1" data-bbox="305 1440 1146 1837"> <thead> <tr> <th>Forage product</th> <th>Amount</th> <th>Average unit price</th> </tr> </thead> <tbody> <tr> <td>Green feed (kg)</td> <td></td> <td></td> </tr> <tr> <td>Hay (kg)</td> <td></td> <td></td> </tr> <tr> <td>Seed (kg)</td> <td></td> <td></td> </tr> <tr> <td>Cutting (number)</td> <td></td> <td></td> </tr> <tr> <td>Splits (number)</td> <td></td> <td></td> </tr> <tr> <td>Crop residue (kg)</td> <td></td> <td></td> </tr> <tr> <td>Seedlings (number)</td> <td></td> <td></td> </tr> <tr> <td>Others (specify) ----</td> <td></td> <td></td> </tr> </tbody> </table>	Forage product	Amount	Average unit price	Green feed (kg)			Hay (kg)			Seed (kg)			Cutting (number)			Splits (number)			Crop residue (kg)			Seedlings (number)			Others (specify) ----			
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Section 7: Livestock, Poultry, Forage and Business knowledge assessment.

Questions are multiple choice. Pick the **one** choice for each that best answers the question.

S.No	Questions	Responses
701	<p>Which of the following feeds can reduce the occurrence of milk fever in dairy cows (hypocalcemia; cow goes down soon after calving) and the occurrence of soft egg shells?</p> <p>1= Salt 2 = Limestone 3 = Bole mineral 4 = Noug cake 5. Don't know</p>	<input data-bbox="1317 422 1446 485" type="text"/>
702	<p>Feeding 1 kg of noug cake per day to a crossbred dairy cow grazing pasture will support the same daily milk production as:</p> <p>1= 0.5 kg cottonseed cake 2= 1.0 kg cottonseed cake 3= 1.2 kg cottonseed cake 4= 1.0 kg wheat bran 5. Don't know</p>	<input data-bbox="1317 600 1446 663" type="text"/>
703	<p>In a cut-and-carry system grass cut 30 days after the last cutting of the same plot can support _____ daily milk production when fed to a crossbred dairy cow as grass cut 60 days after the last cutting.</p> <p>1= the same 2= more 3= less 4. Don't know</p>	<input data-bbox="1317 837 1446 900" type="text"/>
704	<p>A dairy cow fed _____ in combination with Elephant grass will produce more milk per day than when fed Elephant grass alone.</p> <p>1= Rhodes grass 2= Vetch 3= Teff straw 4. Don't know</p>	<input data-bbox="1317 1026 1446 1089" type="text"/>
705	<p>If you plant a piece of your farm land to forage which you will later sell as baled hay, what information do you need to collect so that after the sale you can know if you made a profit or loss?</p> <ol style="list-style-type: none"> 1. amount of money spent on inputs and labor to raise the forage and marketing expense (baling and transporting) 2. price received per bale of forage sold 3. bale size (big or small) 4. number of bales sold 5. 1 and 2 6. 1, 2 and 4 7. Don't know 	<input data-bbox="1317 1278 1446 1341" type="text"/>
706	<p>If you have the choice of investing your money in raising broiler chickens or fattening sheep for income, how would you decide which to do?</p> <ol style="list-style-type: none"> 1. Compare the cost of inputs for each and choose the smaller of the two 2. Compare market prices for each and choose the larger of the two 3. Compare market price minus input cost for each and choose the larger of the two 4. Don't know 	<input data-bbox="1317 1520 1446 1583" type="text"/>

Section 8: Technology and Management Practices

S.No	Questions	Responses
801.	Do you use any of the following improved practices?	1= Yes 2= No
A.	Cut and carry	
B.	Feeding troughs to feed animals	
C.	Drinking troughs to provide clean water for animals	
D.	Rotational grazing	
E.	Record keeping of any kind (related to production and yield of animals: egg, milk, weight, length of fattening period, lactation, expenses, etc.)	
F.	Do you feed a total mixed ration (i.e. all feeds are mixed together before feeding; including e.g. roughage if for livestock like cattle)?	
G.	Forage chopping	
H.	Baling	
I.	Supplementation of crop residues with green fodder	
J.	Urea treatment of crop residues	
K.	Supplementation with urea molasses lick blocks	
L.	Hay making	
M.	Silage making	
N.	Do you feed factory produced formulated feed?	
O	Provide free choice access to clean water	

Name of Respondent_____

End of the Questions

Thank you very much again for your kind cooperation