



Ethiopia Food for Progress Project – Feed Enhancement for Ethiopian Development III (FEED III)

Final Evaluation

2/25/2021

Final Evaluation of Feed Enhancement for Ethiopian Development – Phase III (FEED III)

Program: Food for Progress

Agreement Number: FCC-663-2017/030-00

Funding Year: Fiscal Year 2017

Project Duration: September 2017 – April 2021

Implemented By: ACDI/VOCA

Evaluation Authored By:

DAB Development Research and Training (DAB DRT) Evaluation Firm

Agajie Tesfaye, Team Leader

Dr. Befikadu Esayas, PhD

Bedaso Taye

Nigatu Alemayehu, PhD

Fikadu Chala

DISCLAIMER: This publication was produced at the request of the United States Department of Agriculture. It was prepared by an independent third-party evaluation firm. The authors' views expressed in this publication do not necessarily reflect the views of the United States Department of Agriculture or the United States Government.

Table of Contents

List of Acronyms.....	8
Executive Summary.....	10
Project Background and Purpose.....	10
Evaluation Questions, Design, Methods, and Limitations	10
Findings and Conclusions	11
Recommendations	12
1. Introduction and Purpose	14
1.1. Project Context	14
1.2. Project Description.....	14
1.3. Results Framework.....	15
1.4. Purpose of the Evaluation.....	15
2. Evaluation Design and Methodology	17
2.1. Evaluation Questions	17
2.2. Evaluation Design.....	17
2.3. Sampling Methods	18
2.4. Data Collection Methods	18
2.5. Data Analysis Methods	18
2.6. Evaluation Limitations.....	19
3. Findings	20
3.1. Demographic and Socioeconomic Profiles of Respondents	20
3.2. Household Livelihood Activities and Income Sources	22
3.2.1. Livestock Ownership	23
3.3. Dairy Production and Value Chain	24
3.3.1. Milk Production and Productivity	24
3.3.2. Dairy Animal Feeding Practices.....	27
3.3.3. Livestock Product Marketing	28
3.3.4. Gender Role in Dairy Production	31
3.3.5. Challenges in Dairy Production	32
3.3.6. Adoption of Improved Dairy Feed.....	34
3.3.7. Access to Concentrate Feed.....	35
3.4. Animal Fattening and Value Chain.....	36

3.4.1.	Animal Fattening	36
3.4.2.	Access to Training for Animal Fattening	37
3.4.3.	Purchase of Animal Concentrate Feed.....	37
3.4.4.	Major Challenges Faced in Animal Fattening.....	39
3.4.5.	Coping Strategies for Feed Problems of Fattening Animals	39
3.4.6.	Price Fluctuation of Concentrate Feed for Fattening Animals.....	40
3.4.7.	Feed Quality Check Methods	40
3.5.	Poultry Production and Value Chain	41
3.5.1.	Poultry Production	41
3.5.2.	Poultry Concentrate Feed and Value Chain Actors.....	47
3.5.3.	Feed Millers and Concentrate Feed Producers.....	48
3.5.4.	Gender Perspectives in Poultry Production and Management	49
3.5.5.	Sheltering Practices in Poultry Production	51
3.6.	Forage Production and Feed Value Chain.....	51
3.6.1.	Forage Production and Nursery Establishment	56
3.7.	Technology Transfer by Model Farmers	58
3.8.	Project Evaluation Results Against the OECD-DAC Criteria	59
3.8.1.	Project Relevance.....	59
3.8.2.	Project Efficiency.....	59
3.8.3.	Project Effectiveness.....	60
3.8.4.	Project Outcomes and Impacts.....	61
3.8.5.	Project Sustainability	63
3.9.	Best Practices and Lessons Learned From FEED III Project.....	63
4.	Conclusions	64
5.	Recommendations	66
	Annexes.....	69
	Bibliography	69
	Annex A: Detailed Tables and Figures.....	70
	Annex B: Project Evaluation Against the OECD-DAC Criteria.....	79
	Annex C: Detailed Evaluation Methodology	90
	Annex D: Data Collection Tools.....	94
	D1 Household Survey Questionnaire	94
	D2 Primary Cooperatives Questionnaire	117

D3 Key Informant Interview Tool	123
D3a: Key Informant Interview (KII) Guide for ACDI/VOCA.....	123
D3b: Key Informant Interview (KII) Guides for Stakeholders.....	129
D3c: Key Informant Interview (KII) Guides for Smallholder Farmers.....	131
D4: Focus Group Discussion (FGD) Interview Guides for Smallholder Farmers	137
D5: Case Studies Guides.....	140
D6: Field Observation Checklist	141

List of Figures

Figure 1. Gender roles in decision-making of dairy products sale.....	32
Figure 2. Dairy products and installed molasses tanker at Merkeb Union in Bahardar	38
Figure 3. Upgraded conveyer in Amhara Region	39
Figure 4. Affordability of concentrate feed for poultry production	49
Figure 5. Decision-making practices in poultry production and marketing, 2020.....	50
Figure 6. Decision-making practices to purchase concentrate chicken feeds, 2020	51
Figure 7. Housing practices for chicken among beneficiary and non-beneficiary farmers, 2020	51
Figure 8. The practice of growing forage crops by beneficiary and non-beneficiary farmers, 2020.....	53
Figure 9. Farmers' land allocation practices for forage crops, 2020	53
Figure 10. Percentage of follower farmers and their use of different improved practices.....	58
Figure 11. Income generated from sales of poultry products	61
Figure 12. Adoption rates of forage crops	62
Figure 13. Top five challenges in poultry production during baseline.....	76
Figure 14. Top five challenges in poultry production during end line	76
Figure 15. Household experiences of purchasing forage inputs in the last 12 months, 2020.....	78
Figure 16. Sources of forage inputs for beneficiary farmers, 2020	78
Figure 17. Problems of forage supply for beneficiary farmers, 2020	78
Figure 18. Budget utilization status by region (left) and by activity (right)	81

List of Tables

Table 1. Household head sex composition by beneficiary and non-beneficiary status	20
Table 2. Demographic profiles of respondents in %.....	21
Table 3. The age and family size of respondents by region and survey period	21
Table 4. Total annual income per household (net benefit, contribution, and attribution).....	23
Table 5. Proportion of households engaged in dairy farming before and after the project	24
Table 6. Lactating cow ownership (no. of cows per household) over time and by type of breed	25
Table 7. Milk productivity (liter/day/cow) before and after project intervention	25
Table 8: Average lactation period (months) over single lactation period by breed and time.....	26
Table 9. Feed sources of dairy cows before and after the project (% of households)	27

Table 10. Feeding practices (% of households using different type of feeding practice for dairy cows) ...	27
Table 11. Physical and chemical treatment of dairy feed practiced by farmers (%)	28
Table 12. Proportion of households selling dairy products before and after project interventions.....	29
Table 13. Quantity of livestock products sold per annum by the households (kg or liter)	29
Table 14. Annual average income (Birr/annum) earned from dairy products during baseline and end line	30
Table 15. Dairy products selling places (%).....	31
Table 16. Trends of dairy production problems in the project periods.....	33
Table 17. Experience of purchasing dairy concentrate feed before and after the project	34
Table 18. Average distance to concentrate feed sales point in walking minutes	35
Table 19. Perception of dairy farmers on the availability of concentrate feeds and feed market information (%)	36
Table 20. Percentage of households reporting participation in animal fattening.....	36
Table 21. Poultry production market outlet for baseline and beneficiary households (% of respondents)	41
Table 22. Average number of household poultry ownership by region, 2020	43
Table 23. Types of concentrate feeds fed to chickens in the last 12 months at the time of baseline (2018) and end line (2020) studies (% of households)	44
Table 24. Types of management practices applied to poultry production (% of respondents)	44
Table 25. Annual average poultry egg productivity per hen (egg/clutch and egg/year) by breed.....	44
Table 26. Market outlets where farmers sell poultry products (% of respondents)	45
Table 27. Average annual sales (No.) and revenues (Birr) of poultry products per household in 2018 and 2020	46
Table 28. Training providers on improved poultry production	47
Table 29. Main value actors for poultry production (%).....	47
Table 30. Households' engagement in forage production before and after the project (% of households)	52
Table 31. Actors involved in providing improved forage trainings	54
Table 32. Forage adequacy status and its effects (% of households), baseline (2018)	54
Table 33. Forage adequacy status and its effects (% of households), end line (2020).....	55
Table 34. Percentage of follower farmers that received transfer of knowledge from model farmers over the past four years	58
Table 35. Percentage of households reporting participation in crop production	70
Table 36. Percentage of households reporting participation in dairy production	70
Table 37. Percentage of households reporting participation in animal fattening.....	70
Table 38. Percentage of households reporting participation in poultry production.....	70
Table 39. Average livestock ownership by breed (baseline and end line surveys).....	70
Table 40. Percentage of households reporting purchase of animals for fattening	71
Table 41. Percentage of households reporting receiving training on animal fattening	71
Table 42. Percentage of households reporting the purchase of concentrate feed for fattening animals .	71
Table 43. Percentage of households reporting the adequacy of feed distribution channels	72
Table 44. Percentage of farmers reporting feed problems for fattening animals (multiple response items)	72

Table 45. Percentage of households reporting coping strategies used for feed problems for fattening animals (multiple response items).....	72
Table 46. Percentage of households reporting on the affordability of concentrate feed for fattening animals (multiple response times).....	73
Table 47. Percentage of households reporting price fluctuation of concentrate feed for fattening animals	73
Table 48. Percentage of households reporting checking the quality of feed purchased for fattening animals	73
Table 49. Percentage of households reporting quality checking methods (multiple response items)	73
Table 50. Gender role in dairy production activities	74
Table 51. Who transferred the knowledge to the follower farmers?	75
Table 52. How did you receive the knowledge transfer?	75
Table 53. Quantity of poultry feed used and total cost of feed during baseline study, 2018	76
Table 54. Quantity of poultry feed used and total cost of feed during end line study, 2020	76
Table 55. Percentage of training recipient households and adopters of planting material in past 12 months	77
Table 56. Major forage production problems by region and number of respondents, 2018	77
Table 57. Forage varieties grown and used by survey households (%) during baseline and end line.....	77
Table 58. FEED III project budget utilization status of regions in the project period (Ethiopian Birr)	80
Table 59. FEED III project budget utilization status by activity (Ethiopian Birr)	80
Table 60. Plan versus achievement of FEED-III project outputs and indicators	83
Table 61. FEED III outcome indicators, baseline and end line values	85
Table 62. Performance of FEED III intermediate results	86
Table 63. FEED III project staff qualification by education	Error! Bookmark not defined.

List of Acronyms

Acronym	Full Term
<i>AGP</i>	Agricultural Growth Program
<i>ATA</i>	Agricultural Transformation Agency
<i>B2B</i>	Business-to-Business
<i>Be</i>	Beneficiaries
<i>BL</i>	Baseline
<i>CBO</i>	Community-Based Organization
<i>CoP</i>	Chief of Party
<i>CSA</i>	Central Statistical Authority
<i>DA</i>	Development Agent
<i>DID</i>	Difference in Difference
<i>EIAR</i>	Ethiopian Institute of Agricultural Research
<i>EL</i>	end line
<i>ESA</i>	Ethiopian Standards Authority
<i>ETB</i>	Ethiopian Birr
<i>FGD</i>	Focus Group Discussion
<i>Ha</i>	Hectare
<i>ILRI</i>	International Livestock Research Institute
<i>KII</i>	Key Informant Interview
<i>MoA</i>	Ministry of Agriculture
<i>MT</i>	Metric Ton
<i>OECD/DAC</i>	Organization for Economic Cooperation & Development/Development Assistance Committee
<i>QDS</i>	Quality Declared Seed
<i>Qty</i>	Quantity
<i>SLM</i>	Sustainable Land Management
<i>SNNP</i>	Southern Nations Nationalities and Peoples
<i>SPSS</i>	Statistical Package for Social Sciences
<i>ToR</i>	Terms of Reference

TOT

Training of Trainers

USDA

United States Department of Agriculture

ACDI/VOCA

Agricultural Cooperative Development International/Volunteers in Overseas
Cooperative Assistance

EXECUTIVE SUMMARY

Project Background and Purpose

FEED III was a 44-month project funded by the United States Department of Agriculture (USDA) Food for Progress Program, implemented by ACDI/VOCA from September 2017 to April 2021. The project targeted feed growers, feed service providers, livestock producers, government personnel, extension agents, feed processors, and related enterprises located in the Amhara, Oromia, Southern Nations, Nationalities, and Peoples' (SNNP), and Tigray regions of Ethiopia.

The project addressed the following efforts:

- USDA's Food for Progress strategic objectives of:
 1. Increased agricultural productivity
 2. Expansion of trade in agricultural products
- Government of Ethiopia's Agricultural Growth Program (AGP) and Livestock Master Plan
- US Government's Feed the Future strategies

The project specifically aimed to:

- Deepen the capacity of agricultural enterprises to participate effectively at scale in the livestock value chain and strengthen their sustainability through greater integration with the commercial private sector
- Expand trade of agricultural products in the livestock and poultry sectors by enabling the growth of feed, forage, fattening, poultry, and dairy enterprises, and expanding market opportunities for their products, building on investments in human and physical infrastructure made during Phases I and II
- Contribute to the increased resilience of livestock-owning households

The final evaluation aimed to assess whether the project has achieved the expected results, as outlined in the Results Framework. The evaluation assessed project design, implementation, management, lessons learned, and replication. The evaluation was carried out in three regions of Ethiopia (Amhara, Oromia, and SNNP), and in a sample of 12 representative woredas (districts), three per region, where the FEED III project was implemented. It was not carried out in Tigray due to security reasons.

Evaluation Questions, Design, Methods, and Limitations

The evaluation employed a mixed-methods approach using quantitative and qualitative methodologies. It was conducted in a consultative and collaborative manner with project beneficiary and non-beneficiary groups at all levels of data collection.

Qualitative data was collected through 40 key informant interviews (KIIs), 72 in-depth interviews, 20 focus group discussions (FGDs), and 8 case studies.

Quantitative data was collected using a structured questionnaire administered to 1,630 randomly selected households (1,084 beneficiary and 546 non-beneficiary). Data was collected electronically using the CSPro application. Enumerators and supervisors were trained intensively on data collection approaches, along with field-level pre-testing. Data was analyzed using SPSS 24, Stata 14, and MS-Excel.

Findings and Conclusions

Dairy Production: FEED III interventions contributed to a 13 percent increase in households engaged in dairy production, from 45 percent at baseline to 51 percent at end line. This increase coincides with a 22 percent increase in milk productivity per cow. There is evidence that the project increased per cow productivity, the number of cows, and household engagement in dairy production. The project has almost doubled the percentage of dairy farmers selling milk, from 17 percent at baseline to 28 percent at end line. These increases were not observed in the non-beneficiary group. This implies a net increase in farmers selling milk by 65 percent, which can be directly attributed to FEED III interventions. Project interventions led to a more than 50 percent increase in quantity of milk sold per household, from 611 liters per year at the beginning of the project to 931 liters at the end of the project, while those in non-beneficiary areas show a 10 percent reduction.

Additionally, the data indicate a 35 percent increase in total milk produced by project beneficiaries involved in dairy. This is a staggering 125 percent more than non-beneficiaries, as the total milk production for non-beneficiary farmers went down substantially relative to baseline. This indicates that the dairy cows became more productive, and farmers chose to keep fewer of them because greater production from fewer cows is better than keeping a bigger herd. This indicates that the project contributed to increasing the efficiency of the dairy farmers, in addition to increasing production and productivity.

Dairy farmers in intervention woredas in all the study regions significantly increased incomes from dairy products. Income generated from milk sales increased from Birr 5,679 at baseline to Birr 15,591 at end line. The incomes of non-beneficiary farmers increased to only Birr 9,595. This implies that a net 36 percent increase in income from milk can be directly attributed to FEED III interventions. Project interventions on gender issues brought substantial improvements in empowering women, but increased women's responsibilities because of the increased dairy activities. For instance, the percentage of women engaged in feeding of cows was 23 percent at baseline and 85 percent at end line. At the same time, the proportion of women selling cows and dairy products also increased.

Animal Fattening: The involvement of households in animal fattening was 29.2 percent for beneficiary households and 20.1 percent for non-beneficiary households in all areas. The participation rate of beneficiaries is between 49 percent in Amhara and 17 percent in the SNNP, suggesting regional variations. The percentage of farmers engaged in livestock fattening, who had received animal fattening training in the last 12 months, increased consistently and substantially across regions from 24.2 percent at baseline to 94 percent at end line for the beneficiary households. This is compared to 14.6 percent for non-beneficiaries.

About 33.4 percent of the beneficiary households purchased feed concentrate in the end line sample versus 40.6 percent at baseline. While 40.6 percent of beneficiary farmers at end line, versus 14 percent

at baseline, reported feed distribution channels as adequate (thanks to FEED cooperative unions expanding their feed outlet networks), the reduction in households purchasing feed concentrate may be attributed to a rise in purchasing factory byproducts and growing forage. It may also be attributed to fewer households fattening animals.

Regarding the concentrate feed for fattening animals, only 11.5 percent of households deemed it affordable at baseline, and 23.6 percent of beneficiary and 14.4 percent of non-beneficiary households at end line.

Poultry production: The farmers' ownership of different chicken breeds has substantially improved during FEED III. At baseline, households owned 1.6 improved chickens on average, and at end line, 8.2 improved chickens. At end line, ownership for non-beneficiary farmers reached an average of 5.6 chickens. In terms of scale, FEED III increased ownership for beneficiary farmers by 3 improved chickens, or an average of 54 percent.

The main poultry product in a rural household is eggs, which are an important source of cash, especially for women and youth. At baseline, productivity of local chickens was 37 eggs per clutch. Following project interventions on improved chicken feeding practices, productivity increased to 44 eggs per clutch, indicating that the project contributed to a 19 percent increase in egg productivity. One of the project's contributions was enhancing participant farmers' incomes. Before the project, farmers generated Birr 3,168 from the sale of poultry products. At the end of FEED III, this increased to Birr 4,848 for beneficiaries and Birr 3,203 for non-beneficiaries. This implies that FEED III enhanced the incomes of poultry farmers by Birr 1,645 per household, a net increase of 51 percent.

Forage production: Before commencement of FEED III, only 9 percent of the farmers were engaged in forage production. After project interventions, forage grower households reached 30 percent, which is more than a three-fold increase. Towards the end of the project, the proportion of non-beneficiary farmers engaged in growing forage crops was 11 percent. This implies that FEED III exclusively contributed to the 19 percent increment of forage growers. Forage nurseries established in the project regions are largely contributing to the production and distribution of seedlings to the farmers. However, due attention is required to the nursery sites post project so they operate at full capacity.

Model and follower farmers: Over the life of the project, about 85 percent of the follower farmers received knowledge on dairy animal nutrition and management, 82 percent on improved fattening management, 77 percent on improved poultry nutrition and feeding, and 73 percent on improved forage production. About three-fourths of the follower farmers received technology transfer from model farmers, and the remaining 22 and 4 percent, from development agents (DAs) and other sources, respectively. This indicates that the model farmers play a significant role in technology transfer (i.e., from farmer to farmer).

Recommendations

- Considering the project's success, it would be important for the feed market system actors to continue building and maintaining the market information system, expanding feed channels, diversifying revenue, and resolving feed-related issues to sustain the project's good practices. Offices

of Agriculture and Non-Governmental Organizations (NGOs) can also play roles in scaling up successful FEED III initiatives.

- Based on the findings, it would be important to continue advancing the feed market information system, expanding feed distribution channels, and providing periodic awareness training on the benefits of animal fattening as one of the livelihood strategies. The Woreda Agriculture and Livestock Offices should work in partnership with locally deployed NGOs, higher education institutions, farmer unions and cooperatives, and others on upgrading animal fattening practices as part of the livelihood diversification strategies, fitting them to different agroecological settings.
- The positive outcomes and best practices of FEED III in animal fattening, and poultry, forage, and dairy production need to be scaled up and handed over to government. The findings should be disseminated to the feed market system stakeholders.
- To make the project achievements sustainable, strengthen inter- and intra-institutional collaboration with defined roles and responsibilities.
- Agricultural extension workers in respective woredas should keep helping FEED III beneficiary farmers. The livestock departments of the woreda offices of agriculture should keep providing technical support to the farmers.
- Feed processing enterprises need to be supported technically and financially to help them supply feed inputs on a sustainable basis.
- Provide support for feed ingredient importers. Feed ingredient importers are facing acute hard currency shortages. As a result, feed processors are having problems with producing quality feed. The price of concentrate feed also sky-rocketed, which may affect the productivity of the dairy, animal fattening, and poultry sectors.
- Enhance the technical and financial capacities of the feed manufacturing cooperatives. Cooperatives are still in need of technical support on improved management and accounting practices. Training and experience sharing is required for cooperatives to strengthen their management capacity. Offices of Agriculture, the Cooperative Promotion Agency, NGOs, and other development partners engaged in the agriculture sector can support this.
- Feed processing, dairy, fattening, and poultry enterprises need access to finance. These enterprises often start their businesses with limited capital, which does not allow them to scale and keep up with the growing demand.
- Strengthen and scale up video-based extension services to the farmers engaged in the livestock sector and beyond. Farmers highly preferred video-based extension services because they provided opportunities for learning best practices and success stories of other progressive farmers. Videos should feature success stories of the farmers in their locality or other places and should be narrated in local languages.
- Support and strengthen day-old chick hatching enterprises. As the farmer awareness of smallholder poultry production practices is increasing, their demand for chicks and pullets will also grow. Poultry farmers require a sustainable supply of chicks and pullets. Therefore, hatching enterprises need financial and technical supports through training and experience sharing.
- The respective woreda agriculture offices should strengthen forage nurseries technically and logistically to help them supply forage seedlings and cuttings to the farmers on a sustainable basis.

Nursery management can be a good income-generating activity for rural youth. It is advisable to establish new nurseries across different parts of the country. This should be preceded by awareness creation and experience sharing among farmers and other stakeholders.

1.Introduction and Purpose

1.1. Project Context

Ethiopia's livestock population, with an estimated 65 million cattle (7.2 million dairy cows), 40 million sheep, 51 million goats, 7.7 million camels, 2.1 million horses, and nearly 49 million poultry, generates more than 1,128 metric tons (MT) of meat, 317 million eggs, and 5.7 billion liters of milk per year. It is the largest on the African continent (CSA, 2020). The sector engages more than 14 million households (70 percent of the population), of which, a large number are poor. The average herd is small, consisting of less than one dairy cow, four goats, three sheep, and four chickens. Livestock value accounts for 45 percent of the country's gross domestic agriculture products. While Ethiopia has the largest livestock and poultry population in Africa, the per capita consumption for livestock products, particularly meat, is extremely low, even by African standards. Per capita intake of livestock products is 9 kg of meat, 16.7 liters of milk, and approximately 4 eggs per year.

Livestock and poultry feed are crucial for growth and sustainability of meat, milk, and egg value chains and for the well-being of those whose livelihoods depend on them. Feed plays a vital role in livestock rearing and accounts for 60 percent or more of the cost of production. Traditionally, animal and poultry feeds consist of crop residues, such as straw, stover, and native forage from communal pastures and rangelands.

However, such diets are low in energy and protein, which reduce animal productivity and health. Worse still, traditional grazing resources continue to decline due to the lack of proper management and conversion to crop production. Droughts are more frequent and more severe, adversely impacting the availability of feed. Thus, although Ethiopia has the largest livestock population and livestock is the main livelihood for most of the population, production in the sector has been declining for many years. Inadequate quantity and quality of feed resources, along with poor marketing processes are the major challenges facing the livestock and poultry sectors (MoLF Report 2017).

Understanding that feed quantity and quality are the main constraints for the growth of the livestock sector, the Government of Ethiopia and its funding agencies are investing heavily in the sector to resolve the challenges. FEED III was implemented in four regional states of Ethiopia (Amhara, Oromia, SNNP, and Tigray) as part of holistic, comprehensive, and integrated policy and strategic efforts to improve the feed value chain and increase the incomes of Ethiopian smallholder livestock producers.

1.2. Project Description

FEED III was a 44-month project funded by USDA and implemented by ACDI/VOCA from October 2017 through April 2021 with an operating budget of about \$9 million. FEED III built on FEED I and II, which piloted the approach to feed sector development that combined capacity building of extension services and smallholder farmers with the establishment of cooperative union-based commercial feed manufacturing enterprises, forage seed nurseries, and market-oriented livestock enterprises. The project

targeted feed growers, feed sector service providers, livestock producers, government personnel, extension agents, and feed processors and related enterprises.

FEED III is a third and final phase of a series of projects that aimed 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. FEED III faced a few implementation challenges, including an overlap with FEED II and a delayed start due to a delay in the approval of the baseline report. The baseline survey report was approved in late 2018. As a result, the first round of livestock training for farmers did not take place until the fall of 2018. Another challenge was travel and gathering restrictions in 2020 due to COVID-19. These disruptions shortened the project's implementation period.

1.3. Results Framework

FEED III scaled out to new communities by expanding its extensive union and primary cooperative-based sales and distribution network, supported by the extension service delivery of training videos produced by the project. This aimed to grow the number of livestock dependent households with access to improved feed and the skills to use it effectively. In doing so, the project addressed USDA's Food for Progress strategic objectives (SOs) of increased agricultural productivity (SO1) and expanded trade in agricultural products (SO2), as well as Feed the Future objectives and the Government of Ethiopia's (GOE) Agricultural Growth Plan (AGP) and Livestock Master Plan.

The project specifically aimed to:

- I. Deepen the capacity of agricultural enterprises to participate effectively at scale in the livestock value chain and strengthen their sustainability through greater integration with the commercial private sector
- II. Expand trade of agricultural products in the livestock and poultry sectors by enabling the growth of feed, forage, fattening, poultry, and dairy enterprises, and expanding market opportunities for their products, building on investments in human and physical infrastructure made during Phases I and II
- III. Contribute to the increased resilience of livestock-owning households

The main FEED III outcomes include adopting improved feed management practices, increasing supply of feed and forage inputs, improving business and financial management of feed enterprises, and improving feed policies, regulations, and ancillary service providers.

The project carried out the following five key activities:

1. Developing the feed ingredient supply chain
2. Building capacity and growing feed sector enterprises
3. Developing sustainable forage production systems
4. Expanding fattening, dairy, and poultry enterprises
5. Promoting improved on-farm feeding practices

1.4. Purpose of the Evaluation

The purpose of the final evaluation was to assess whether the project has achieved the expected results as outlined in the Results Framework. The specific objectives of the evaluation were to:

- I. Determine the final values for contextual, outcome, and impact level performance indicators, as outlined in the project performance monitoring plan
- II. Collect household socioeconomic data pertaining to livestock farmers in the project target woredas
- III. Identify and document how, and to what extent, feed, forage, and livestock production activities promoted smallholder productivity, economic well-being, and resilience
- IV. Identify strengths and weaknesses of project activities in relation to supporting the growth and sustainability of targeted feed manufacturers
- V. Assess the impact of the COVID-19 pandemic on activity implementation, outcomes, and sustainability of results
- VI. Identify key lessons to be learned from activities that can be applied to future projects with similar objectives

The final evaluation will allow ACDI/VOCA and USDA to reflect on the project's achievements, strengths, and sustainability, as well as to understand any weaknesses, lessons learned, and best practices for implementing future interventions.

2. Evaluation Design and Methodology

2.1. Evaluation Questions

The following is an illustrative list of learning questions:

- To what extent have farmers adopted the practices and technologies encouraged by FEED III? What are the differences in adoption rate among these practices and technologies, and the reasons why some are more readily adopted than others?
- Are farmers finding that manufactured feed and forage planting materials (seeds/seedlings) are closer and/or more easily accessible and affordable than before? To what extent have project activities contributed to this?
- Are targeted cooperatives and union feed enterprises operating as businesses? To what extent did FEED III activities contribute to their capacity to do so? Do they have business plans that are followed and revisited on a regular basis? To what extent have they used credit to grow their businesses? Are they profitable?
- What impact has increased availability of manufactured feed had on downstream economic activity (e.g., by poultry raisers, dairy farmers, milk processors and retailers)?
- How have livestock, poultry, and forage production training videos been received by farmers? What about development agents? What strengths and weaknesses do each of them see in this training method as opposed to the traditional approach?
- Has the role of women in livestock, poultry, and/or forage production on the farm been impacted by project activities? If so, how?
- In what ways have union-based feed manufacturing activities been impacted by the arrival of COVID-19 in Ethiopia? Have they been able to adapt to these impacts? If so, how?

2.2. Evaluation Design

FEED III final evaluation employed a mixed-methods approach using both quantitative and qualitative methodologies. The evaluation also followed a participatory approach in which project staff and relevant stakeholders and targets of the project, including farmers, cooperative unions, and woreda extension experts, are consulted.

The end line evaluation used OECD-DAC evaluation criteria that included:

- a. Relevance
- b. Effectiveness
- c. Efficiency
- d. Impact
- e. Sustainability

Based on the objectives of the project, the final evaluation team first identified key baseline indicators in the results framework and investigated the extent to which the expected results were achieved, which interventions worked best, and the factors that explain the findings. To assess the impact of the COVID-19 pandemic on the project, the evaluation team also included questions on its impact on the progress of the plan and the results.

2.3. Sampling Methods

Study target groups were livestock owners that had been targeted by the project since 2018 and whose baseline information was collected. The non-beneficiary groups were selected from the same woredas as the beneficiary groups, but in different kebeles where beneficiary groups were not found (i.e., kebeles where FEED III was not implemented).

The sampling technique for the household survey was multi-stage, using a stratified random sampling method that cascaded down from woreda to an individual household, which was the ultimate unit of analysis. Since all intervention regions are covered (except Tigray, which was excluded because of security concerns), the sampling first identified an equal number of woredas¹ from all regions, just like the baseline survey. Next, the sample size from each woreda was determined based on Proportion to Population Size (PPS). A project beneficiary list was obtained from FEED III. The proportion of sample that falls in each woreda is based on the number of project participants in the woreda. Then, the project randomly selected three kebeles from the list of intervention kebeles. Since the total sample size of the woreda is known, the same PPS procedure is used to determine sample size from the three kebeles based on the ratio between beneficiary and non-beneficiary groups (67:33). Random selection is done using random numbers generated in Excel.

Using a household list from FEED III, the beneficiary groups were selected from the project intervention kebeles, and non-beneficiary groups were selected from the kebeles where the baseline survey was conducted but not targeted for project intervention. Sample households for beneficiary groups were selected from the list of smallholder farmers trained by the project from the project database. Non-beneficiary households were selected from the list of non-intervention kebeles using random sampling techniques. Both households were interviewed in a face-to-face manner by trained data collectors. See sample size calculation in Annex B.

2.4. Data Collection Methods

The evaluation used qualitative and quantitative data. Quantitative data was collected using a structured questionnaire administered to 1,630 randomly selected households (1,084 beneficiary and 546 non-beneficiary). Data was collected using Android tablets with the CSPro application. Trained enumerators and a supervisor collected the data after field pre-testing. Qualitative data was collected through 40 key informant interviews (KIIs), 72 in-depth interviews, 20 focus group discussions (FGDs), and 8 case studies. See Annex B for details on quality control and data collection procedures.

2.5. Data Analysis Methods

Quantitative data was analyzed using SPSS 24 and Stata 14. Results from the household survey were analyzed, summarized, and presented using descriptive statistics, such as means and proportions. The statistical outputs were presented in the form of figures, frequency tables, and bar graphs. The findings were also presented using the difference in difference (DID) approach (i.e., comparison of baseline against

¹ Ethiopia has four administrative tiers: Federal, Region, Zone, Woreda and Kebeles. Kebele is the lowest administrative level.

end line and beneficiary against non-beneficiary households). The qualitative information was thematically analyzed with a focus on description of information, classification, and making connections.

The DID evaluation method was used to estimate the impact of the project. DID is a preferred quasi-experimental impact evaluation method when assignment of the beneficiary is not random. The DID estimator is an impact identification strategy that compares the outcomes of project participants and non-participants before and after the implementation of a program and takes the difference as the estimate of beneficiary (Bryson et al. 2002)². Additionally, this method is widely used since it is effective in controlling unobserved variables and trends that may affect outcomes if data are available before and after an intervention.³ To avoid problems in comparing results over the two periods, we adopted the baseline data collection design to enable comparability of results between the two periods. See Annex B for more details on methods.

2.6. Evaluation Limitations

This evaluation was conducted carefully to generate objective evidence on the performance of FEED III. However, it is not free from certain limitations. Particularly, the baseline survey was not separated for control and beneficiary areas. This could affect the validity of the counterfactual. For beneficiary and non-beneficiary, the same baseline value was used, which makes accurate estimation of the project impact difficult. Due to closeness of the beneficiary and non-beneficiary households, there could also be spillover effects and contamination. The evaluation team used qualitative data to identify the true impact of the project and spillovers on top of the qualitative data.

² Bryson, A., Dorsett, R., & Purdon, S. (2002). The use of propensity score matching in the evaluation of active labour market policies [Monograph]. Retrieved December 6, 2012, from <http://www.dwp.gov.uk/>

³Ravallion, M., & Chen, S. (2005). Hidden impact? Household saving in response to a poor-area development project. *Journal of Public Economics*, 89(11), 2183–2204.

3. Findings

3.1. Demographic and Socioeconomic Profiles of Respondents

The data indicates that female-headed households (FHH) constitute 14 percent of the sample, with 20 percent in Oromia, 10 percent in Amhara, and 12 percent in SNNP. This implies that a significant number of respondents are male-headed households (MHH). This value is lower than that from other sources. For example, the recent CSA's mini-demographic survey estimates that more than one household in every four is female-headed (CSA 2014). In this regard, some studies used similar indicators and reported notable differences in the proportion of FHH and MHH across some sites in Ethiopia (McPeak *et al.* 2011).

On the other hand, the level of participation of FHHs between the baseline and end line surveys, and between beneficiary and non-beneficiary households, indicates a slight difference across regions (Table 1), which could be attributable to their increased knowledge and targeting of the FEED III intervention regions. This finding also coincides with the qualitative information given across regions on the targeting of female-headed households by the project.

Table 1. Household head sex composition by beneficiary and non-beneficiary status

Region	Sex	Baseline (N=1,648)	Beneficiary (N= 1,084)	Non-Beneficiary (N= 546)	Overall (N=1,630)
Amhara	Male	94.7	90.0	90.65	90.2
	Female	5.3	10.0	9.34	9.8
Oromia	Male	88.8	75.9	89.6	80.5
	Female	11.2	24.1	10.4	19.5
SNNP	Male	92.7	85.2	92.9	87.7
	Female	7.3	14.8	7.1	12.3
Total	Male	91.7	83.7	91.0	86.1
	Female	8.3	16.3	9.0	13.9

The distribution of the household head's marital status and educational level by survey time and sample groups (beneficiary and non-beneficiary) is provided in Table 2. In terms of marital status, the largest portion of the households (91.3 percent) were married and only 1.2 percent were single in the baseline sample. About the same proportion are married (91.4 percent) and unmarried (0.9 percent) in the end line study, implying that most FEED III beneficiary households are those that have a family.

Only 33.9 percent of participants completed primary education (grades 1–8) and an even smaller number (6.6 percent) completed secondary education in the baseline sample. In the end line study, 40.9 percent and 13.0 percent completed primary and secondary schools, respectively (Table 2). The number of those educated above the secondary level is 2.1 percent in the baseline and 3.0 percent in the end line report. Beneficiary and non-beneficiary groups have a similar level of education, indicating that there has been a small disparity between baseline and end line studies.

Table 2. Demographic profiles of respondents in %

Variables	Category	Baseline (n=1,648)	Beneficiary (n= 1,084)	Non- beneficiary (n= 546)	Overall (n=1,630)
Marital status	Single	1.21	0.74	1.10	0.86
	Married	91.32	91.05	92.12	91.41
	Widowed	4.13	5.90	4.21	5.34
	Divorced	1.88	2.12	1.83	2.02
	Separated	1.46	0.18	0.73	0.37
Level of Education	Cannot read and write/illiterate	44.84	28.60	26.56	27.91
	Informal (religious & adult education)	12.56	14.48	13.92	14.29
	Primary	33.86	41.05	40.48	40.86
	Secondary	6.61	12.82	13.37	13.01
	Above secondary	2.12	3.04	5.68	3.93

From the descriptive statistics, the mean average age of the surveyed respondents is 45 years (n=1,648). The average age of the respondents was approximately the same across regions in the baseline (Table 3) and was 44.22 years in the end line survey, which is statistically significant ($p < 0.01$). A non-significant difference was observed between the beneficiary and non-beneficiary groups. The field survey data indicated that the average family size was six in all regions during the baseline analysis (n=1,648) and was significantly higher in SNNP than in other regions (Table 3). The regional difference in family size may be due to samples taken from the most densely populated areas of SNNPR, including Wolaita, Hadiya, Gamo and Gofa Zones, and Sidama Region (CSA 2007). In general, there is a non-statistically significant gap between baseline and end line studies, and between beneficiary and non-beneficiary households (Table 3).

Table 3. The age and family size of respondents by region and survey period

Indicator variables	Dataset	Respondent group	Region			
			Oromia	Amhara	SNNP	All regions
Average age (years)	Baseline		46	45	44	45
	End line		45.90	43.47	43.30	44.22
		Beneficiary	43.22	46.20	44.65	44.69
		Non-beneficiary	43.97	45.30	40.59	43.29
		Diff-I*	-0.75	0.9	4.06	1.40 (2.14) ^{ns}
	Diff-II**		0.1	1.53	0.7	0.77 (-2.58) **
Average HH size (number)	Baseline		6	5	7	6
	End line		5.86	5.59	7.17	6.21
		Beneficiary	5.92	5.77	7.35	6.35
		Non-beneficiary	5.74	5.25	6.81	5.94
		Diff-I*	0.18	0.52	0.54	0.415 (3.50) ^{ns}
	Diff-II**		0.14	-0.59	-0.17	0.21 (3.91) ^{ns}

Diff-I: Two-sample t-test with unequal variances (compare the means of two group)

Diff-II: T-test for paired means (measurements at points in time t1 and t2)

Note: Diff (t-test result): * ($p < 0.05$), ** ($p < 0.01$), *** ($p < 0.001$)

BE, Baseline and EL, end line

3.2. Household Livelihood Activities and Income Sources

Most of the sample households engaged in crop production to diversify their livelihoods, along with dairy, animal fattening, and poultry production in all areas. The participation of surveyed households in crop, dairy, animal fattening, and poultry production is presented in Tables 35–38 in Annex A.

Regarding dairy production, 50, 46, and 45.7 percent of farmers were engaged in dairy production in the SNNP, Amhara, and Oromia regions, respectively (Table 35 in Annex A). Except crop production, the participation in other livelihood activities slightly declined compared to the baseline. This can be due to the household's involvement in additional income-generating activities, such as animal fattening, poultry, and forage production. The percent of households that participate in dairy production does not show a significant difference between baseline and end line surveys, but there is a statistically significant difference between beneficiary and non-beneficiary households ($p < 0.001$) (Table 36 in Annex A). This reflects the role of FEED III in diversifying income sources of beneficiary households.

Concerning animal fattening, 52.1, 23.5, and 21.2 percent of farmers participated in animal fattening in the Amhara, SNNP, and Oromia regions at end line, respectively (Table 37 in Annex A). There had been a statistically significant difference regarding beneficiary and non-beneficiary households' participation in animal fattening ($p < 0.001$), while there was no significant difference between baseline and end line surveys (Table 37 in Annex A). This finding highlights the contribution of FEED III in expanding sources of income of beneficiary households in the form of animal fattening relative to non-beneficiary households.

Concerning poultry production, 61, 45, and 21 percent of farmers participated in poultry production in the Amhara, SNNP, and Oromia regions at end line, respectively (Table 38 in Annex A). Because we only collected data for the last 12 months, which mostly fell during the COVID-19 crisis period, the decline in the share of farmers that participate in dairy, fattening, and poultry production could be due to the pandemic. We recommend caution in interpreting the results regarding participation in animal fattening, dairy, and poultry production. There is also a statistically significant difference between the baseline and end line surveys of household involvement in poultry production ($p < 0.001$) (Table 38 in Annex A).

Rural households generate income from a wide range of non-agricultural activities on top of their farm and off-farm income sources (Saha and Bahal 2014). On FEED III, dairy, poultry, and forage production, along with animal fattening, made significant contributions to farmers' livelihoods. Table 4 presents a summary of total annual income per household and net benefit, contribution, and attribution of FEED III.

The average annual income from all sources (on-farm, non-farm, and off-farm) was Birr 23,004.5 per household at baseline, and Birr 40,087.7 for the beneficiary group at end line. However, to determine the attribution of the difference to FEED III, we applied a DID approach, whereby the first difference (D1) is between the end line and the baseline for the beneficiary farmers and the second difference (D2) is between the non-beneficiary group and the baseline for scale variables, such as income. A net FEED III benefit is the difference between D1 and D2.

Consequently, the average annual income of the beneficiary farmers at end line was Birr 4,0087.7 per household (Table 4). This means that the project beneficiary farmers, as a result of FEED III, increased their overall average annual income by Birr 10,261.

In terms of proportion, FEED III enhanced total average annual income from all sources by 34.4 percent, while the overall project's contribution stands at 74.3 percent (Table 4). Survey results and statistical analysis ($p < 0.001$) (Table 4) indicate that FEED III was successful in achieving its income objectives.

This finding was supported by qualitative studies in the intervention kebeles. For example, FGD participants from the Guangua Angoye kebele, Awabel woreda, and Yekeyit kebele acknowledged the positive contribution of FEED III training not only to improvement of earnings, but also overall well-being.

"Though it depends on the success of the person, the training is life-changing. Those who properly apply the principle of FEED III training accumulated wealth. We didn't have much to save, if we could see our life, so this time we have at least a bank account and savings."

Moreover, we discovered that there are improved homes, clothing, and other aspects of their lives. As far as resilience, almost all participants acknowledged that while they do not have resources, they have alternatives to escape the crisis, signifying the positive role of FEED III.

Table 4. Total annual income per household (net benefit, contribution, and attribution)

Dataset	Comparison groups	Region			Overall
		Amhara	Oromia	SNNP	
Baseline		22,789.3	32,501.9	13,722.9	23,004.5
End line	Beneficiary	43,616.3	41,581.3	35,126.4	40,087.7
	Non-beneficiary	34,561.2	30,743.6	24,175.3	29,826.7
	DID ^a	9,055.1	10,837.6	10,951.0	10,261.0
	FEED III contribution ^b	91.4%	27.9%	155.9%	74.3%
	FEED III attribution ^c	26.2%	35.0%	45.3%	34.4%
t-test ^c					32.173 (.000)
t-test ^d					42.781 (.000)

^a The difference between D1 (beneficiary baseline) and D2 (non-beneficiary group baseline)

^b The difference between project beneficiary and baseline study as expressed in %

^c DID is divided by the non-beneficiary group as expressed in %

^c t-test between beneficiary and non-beneficiary group at the end line evaluation

^d t-test between baseline and end line data

3.2.1. Livestock Ownership

With regards to livestock ownership, the average indigenous bull ownership per household in all regions is 2.4. The ownership of indigenous bulls was the same in all regions except SNNP. There, the number fell slightly to two indigenous bulls (Table 39, Annex A). Nearly the same pattern was observed in all regions for crossbreed bull ownership. Indigenous cow ownership is an average of 2.13 for all regions and ranges, from 2.6 in Amhara to 1.8 in SNNPR. Indigenous bull ownership was a 2.01 average in all regions at end line, which is a small decrease from the baseline due to destocking because of COVID-19. Ownership of

indigenous bulls differs across regions, as compared to the baseline study (Table 39, Annex A). In relation to crossbreed bull ownership, almost the same trend was observed in all regions except Amhara, where average ownership was marginally higher than in the other two regions (0.36). An average value for indigenous cow possession reached 1.79 in all regions. Indigenous cow ownership varies from 2.09 in Amhara to 1.64 in SNNPR.

3.3. Dairy Production and Value Chain

3.3.1. Milk Production and Productivity

Dairy is one of the main livestock production activities in Ethiopia. CSA data in 2018 indicates that out of 60 million cattle, 12.4 million (21 percent) are milking cows and another 6.7 million (11 percent) are dairy cows. In 2020 the number increased to 65 million cattle, including 12.6 million milking cows and 7.2 million dairy cows. Livestock is one of the main sources of nutrition and income for smallholder farmers in Ethiopia. During the baseline in FEED III project regions, 45 percent of the households were engaged in dairy production (Table 5). After two and half years, the proportion of project beneficiaries engaged in dairy production increased to 51 percent. This indicates that FEED III contributed to the increase of dairy farmers by 13%. Considering non-beneficiaries, the project's attribution is even higher. This is because, the proportion of non-beneficiary farmers engaged in dairy production declined to 33 percent at end line.

The implication is that the training, business linkages, experience sharing, and technical support extended during FEED III largely contributed to the increase in the proportion of farmers engaged in dairy production. According to information from FGDs and KIIs, feed supplies through unions and private feed processors and supplies of forage crops encouraged more farmers to engage in dairy farming. The major problem of dairy farmers is related to the supply of quality feed. If this problem is addressed in a sustainable way, it is likely that the number of dairy farmers will grow over time. The contribution and support of FEED III in this regard was recognized to be substantial.

Table 5. Proportion of households engaged in dairy farming before and after the project

Regions	Baseline (2018)	End line		p-values
		Beneficiary	Non-beneficiary	
Amhara	47	50	36	0.001**
Oromia	48	46	37	0.048**
SNNP	51	57	27	0.000***
Total	45	51	33	-

***, **, and * indicate the difference is statistically significant at 5 percent significance level between beneficiary and non-beneficiary groups.

At baseline, households on average owned 1.4 lactating cows each for indigenous and crossbreds (Table 6). At end line, there were fewer lactating cows, which may imply that at end line the cows were either pregnant or dry or their lactation period was short. FGD and KII participants noted the limited availability and inefficiency of the artificial insemination services, which could be one of the reasons why cows do not get pregnant and do not lactate on time. The alternative explanation is that the farmers have minimized

their dairy herds because of the increased milk productivity from a smaller number of dairy cows. This is further explained below.

Table 6. Lactating cow ownership (no. of cows per household) over time and by type of breed

Region	Type of breed	Baseline	End line	
			Beneficiary	Non-beneficiary
Amhara	Indigenous cows	1.5	1.4	1.8**
	Crossbred cows	1.2	0.4**	0.1
Oromia	Indigenous cows	1.5	1.3	1.5
	Crossbred cows	1.5	0.5**	0.2
SNNP	Indigenous cows	1.3	1.2	1.4
	Crossbred cows	1.2	0.6**	0.3
Total	Indigenous cows	1.4	1.3	1.6
	Crossbred cows	1.4	0.5	0.2

***, **, and * indicate the difference is statistically significant at 5 percent significance level between beneficiary and non-beneficiary groups.

In this evaluation we estimated the average milk yield by dividing total milk production per day by the number of cows milked (milk per day per cow). Before the project intervention, the productivity of crossbred cows was 2.20 liters per day per cow. After the project intervention, the productivity of crossbred cows for beneficiary households was raised to 4.11 liters per day per cow (Table 7). This indicates that FEED III contributed to enhancing the productivity of crossbred cows by 87 percent compared to baseline. A similar trend was observed in all the study regions. During the life of the project, the productivity of crossbred cows for non-beneficiary farmers was 3.38 liters per day per cow. This implies that the net contribution or attribution of FEED III in enhancing milk productivity of crossbred cows was 22 percent.

According to the FGDs and KIIs, FEED III interventions on increasing the knowledge and skills of dairy farmers in managing crossbred cows has largely contributed to the enhanced milk productivity. Apart from this, the supplies of concentrate feeds from unions and private enterprises and access to forage crops have contributed to the increased milk productivity of crossbred cows for beneficiaries compared to the baseline and their non-beneficiary counterparts. Still, the average milk productivity of crossbred cows can be enhanced further by intensifying dairy management practices and supplying the required inputs on a sustainable basis. Dairy farmers also require close technical support of agriculture experts to address emerging problems on time.

Table 7. Milk productivity (liter/day/cow) before and after project intervention

Region	Breed type	Baseline	End line	
			Beneficiary	Non-beneficiary
Amhara	Indigenous	1.32	1.36**	0.98
	Crossbred	2.39	3.51	1.58
Oromia	Indigenous	1.43	2.30	1.62
	Crossbred	1.67	3.49**	1.96

Region	Breed type	Baseline	End line	
			Beneficiary	Non-beneficiary
SNNP	Indigenous	1.80	2.34	1.76
	Crossbred	2.53	4.85	5.05
Total	Indigenous	1.51	1.99**	1.42
	Crossbred	2.20	4.11	3.38

***, **, and * indicate the difference is statistically significant at 5 percent significance level between beneficiary and non-beneficiary groups.

Average lactation period is another important indicator of dairy productivity. At the start of the FEED III project, the average lactation period of crossbred cows was 6.5 months. After project interventions, the period increased to 8.7 months for beneficiary farmers (Table 8). This indicates that FEED III contributed to the increase of lactation period of crossbred cows in beneficiary households by 34 percent. A similar trend was observed for beneficiary households, especially in the Amhara and Oromia regions. Knowledge and skills enhanced by the project largely contributed to the increased lactation period of crossbred cows in beneficiary households. Supply of concentrate feed made by the feed processing enterprises and the distribution of forage seeds and seedlings also contributed to the increased lactation period of crossbred cows.

Table 8: Average lactation period (months) over single lactation period by breed and time

Region	Breed type	Baseline	End line	
			Beneficiary	Non-beneficiary
Amhara	Indigenous cow	8.2	7.7	8.3
	Crossbred cow	5.2	8.4	6.7
Oromia	Indigenous cow	5.7	7.8	7.8
	Crossbred cow	4.9	8.9	8.0
SNNP	Indigenous cow	7.6	8.2	8.4
	Crossbred cow	9.2	8.9	9.5
Total	Indigenous cow	7.2	7.9	8.1
	Crossbred cow	6.5	8.7	8.6

***, **, and * indicate the difference is statistically significant at 5 percent significance level between beneficiary and non-beneficiary groups.

In general, from the above analysis, we can see that for the treated households, the proportion of dairy households increased, cows per household decreased, and milk per cow and lactation period increased. In addition, the data indicate a 35 percent increase in total milk produced by project beneficiaries involved in dairy. It is a staggering 125 percent more than non-beneficiaries, as the numbers indicate total milk production for non-beneficiary farmers went down substantially relative to baseline. This indicates the dairy cows became more productive, and farmers chose to keep fewer dairy cows per head because higher production from a lesser number of cows is better than keeping a greater number of dairy cows. This indicates the project has contributed to increasing the efficiency of the dairy farmers in addition to increasing production and productivity.

3.3.2. Dairy Animal Feeding Practices

Quality dairy animal feed is one of the primary determinants of animal productivity and health. However, shortage of quality dairy animal feed is one of the primary constraints of the sector in the country. Cognizant of this, FEED III promoted improved dairy animal feed over the life of project. As presented in Table 9, the proportion of farmers who sourced concentrated feed at baseline was 11 percent. At end line, this proportion increased to 19 percent. This indicates that FEED III contributed to the increment of farmers who use concentrate feeds by 73 percent, compared to baseline. Similarly, the project contributed to the increment of dairy farmers who use agro-industrial by-products by 16 percent and green forages by 39 percent. FEED III interventions contributed to the increased use of quality feed in the intervention areas. Beneficiary farmers clearly demonstrated the application of knowledge and skills gained from project training, experience sharing visits, B2B linkages, and trade fairs.

Table 9. Feed sources of dairy cows before and after the project (% of households)

Feed sources	Baseline	End line	
		Beneficiary	Non-beneficiary
Dairy concentrate feed	11	19	6
Agro-industrial by-products (wheat bran, noug cake, etc.)	25	29	14
Other high-quality feed (<i>Atela</i> , grains)	27	46	45
Green forage, grass, hay, silage	62	86	86
Crop residue (teff, wheat, maize, and others)	81	73	79
Other	5	2	0

In terms of feeding practices, the data show that 65 percent of the dairy farmers were using a feeding trough before the project (Table 10). At end line, feeding practices were about the same among the beneficiary farmers. In the case of water troughs, FEED III contributed to increasing the proportion of beneficiary dairy farmers using water troughs from 48 percent at baseline to 62 percent at end line, which is a 29 percent contribution.

The proportion of non-beneficiary farmers using water troughs at end line was also higher (54 percent) compared to baseline. This implies that FEED III raised the numbers of dairy farmers using water troughs by 15 percent, which is attributed to the project. The project's trainings and experience sharing visits have contributed to improved dairy management practices, including feeding practices, by dairy farmers.

Table 10. Feeding practices (% of households using different type of feeding practice for dairy cows)

Dairy feeding practice	Baseline	End line	
		Beneficiary	Non-beneficiary
Feeding trough	65	61	52
Water trough	48	62	54
Other (none)	29	31	42

Regarding feed treatment methods, the proportion of farmers using cut and carry practice was 65 percent at baseline (Table 11) and 80 percent at end line for beneficiary farmers. This indicates that FEED III

contributed to the increase in beneficiary dairy farmers using cut and carry feeding practices by 23 percent. Since the proportion of non-beneficiary farmers at end line is the same as at baseline, the project's attribution to the increase in dairy farmers adopting a cut and carry practice is also 23 percent.

At baseline, the proportion of farmers using crop residue treatment was 67 percent. However, this proportion declined to 42 percent at end line. This indicates that the proportion of dairy farmers treating straw with urea declined by 37 percent after project interventions. This might be because they shifted to concentrate feed and forage, the practices promoted by FEED III. Some of the beneficiary dairy farmers also shifted to use cut and carry feeding practices.

Table 11. Physical and chemical treatment of dairy feed practiced by farmers (%)

Treatment methods used	Baseline	End line	
		Beneficiary	Non-beneficiary
Cut and carry	65	80	65
Crop residue treatment	67	42	36
Chopping	0	37	26
Do not know or did not use	16	8	18

3.3.3. Livestock Product Marketing

Selling livestock products is a common practice in rural areas. As illustrated in Table 12, the proportion of dairy farmers selling milk in three of the study regions was 17 percent at baseline and 28 percent at end line, for the beneficiary farmers (Table 12). The proportion of non-beneficiary farmers selling milk was about the same at baseline and end line. This implies that the proportion of the beneficiary dairy farmers selling milk increased by 65 percent, which is attributed to FEED III interventions. Similar trends are true for butter and cheese.

The proportion of dairy farmers selling butter was 27 percent at baseline and 60 percent at end line, which is a 122 percent project contribution. The proportion of non-beneficiary dairy farmers selling butter at end line was 51 percent, also significantly higher than at baseline. This implies that an 18 percent increase in beneficiary dairy farmers selling butter can be attributed to the project. The project contributed to an increase in cheese sellers from 4 percent at baseline to 21 percent at end line. Since 14 percent of the non-beneficiary dairy farmers also sold cheese at end line, FEED III attribution is 50 percent. Apart from the project contribution, the proportion of farmers selling livestock products is also increasing because of the growing demand for dairy products in urban areas, the rising prices of dairy products, and the increasing market orientation of smallholder farmers, among other factors.

There was a large variability among the study regions in selling dairy products. While selling dairy products is becoming common in the Oromia and SNNP regions, it is not yet common in Amhara. For instance, the proportion of dairy farmers selling milk at baseline was 16 percent for Oromia, 27 percent for SNNP, and 5 percent for Amhara (Table 12). Even after the project interventions, the proportion of farmers selling milk in Amhara showed only a minor improvement from 5 to 6 percent. This might be because of the

bigger distance in Amhara between dairy farms and urban centers and towns with large demand for dairy products. Inadequate marketable surplus is another reason for many farmers not yet selling milk.

Table 12. Proportion of households selling dairy products before and after project interventions

Region	Milk product	Baseline	End line	
			Beneficiary	Non-beneficiary
Amhara	Milk	5	6	3
	Butter	9	46	44
	Cheese	2	3	0
Oromia	Milk	26	14	3
	Butter	32	69	54
	Cheese	9	35	33
SNNP	Milk	27	56	49
	Butter	33	66	69
	Cheese	4	35	50
Total	Milk	17	28	16
	Butter	27	60	51
	Cheese	4	21	14

The quantities of dairy products sold substantially increased from the baseline in all regions. As revealed in Table 13, dairy farmers from all regions sold 611 liters of milk per annum at baseline, and 931 liters per annum for the beneficiary households and 550 liters for non-beneficiary households at end line. This indicates that the project increased the quantity of milk sold by beneficiary farmers by 52 percent from the baseline, and by 92 percent from the non-beneficiary groups. This difference between the baseline and end line values for milk sales is statistically significant. The same trend holds true for butter and cheese.

In the Oromia region, households sold 339 liters of milk per annum at baseline and 1,090 liters for the beneficiary farmers and 110 liters for non-beneficiary farmers at end line (Table 13). Overall, FEED III contributed to an increase in the quantity of milk sold by beneficiary farmers compared to the baseline and non-beneficiary groups. FEED III's trainings and experience sharing visits enhanced not only the quantities of dairy products sold, but also improved farmers' attitudes toward marketing and benefiting from dairy products. The business orientation of the beneficiary farmers improved over the life of the project, which is witnessed by increased participation in dairy markets.

Table 13. Quantity of livestock products sold per annum by the households (kg or liter)

Region	Livestock product name	Baseline	End line	
			Beneficiary	Non-beneficiary
Amhara	Milk (liters)	639.0	731.4	550.0
	Butter (kg)	4.1	10.3	6.2
	Cheese (kg)	3.8	48.7	-
Oromia	Milk (liters)	339.0	1,090.2***	110.0
	Butter (kg)	5.8	31.2**	28.9
	Cheese (kg)	22.6	180.9**	125.2
SNNP	Milk (liters)	853.7	916.3	511.7
	Butter (kg)	2.9	46.2**	29.8

Region	Livestock product name	Baseline	End line	
			Beneficiary	Non-beneficiary
	Cheese (kg)	3.1	76.8	57.5
Total	Milk (liters)	610.8	931.3	484.8
	Butter (kg)	4.3	26.5	18.5
	Cheese (kg)	14.6	148.0	112.9

***, **, and * indicate the difference is statistically significant between the baseline and end line values at 1, 5, and 10 percent significance levels, respectively.

Apart from selling crops and live animals, rural households supplement their on-farm incomes by selling dairy products. Dairy farmers in all study regions dramatically increased their incomes from the sale of dairy products during the project. In the case of milk, the overall sample households generated Birr 5,679 from the sale of milk at baseline, and Birr 15,591 for the intervention group and Birr 9,595 for the non-beneficiary group at end line (Table 14). This implies that FEED III helped the beneficiary farmers enhance their incomes from milk sales by about Birr 6,000 compared to the non-beneficiary group (Table 14). In the same way, FEED III contributed to the increased farmer income from butter and cheese by increasing the proportion of beneficiary farmers selling butter by 11 percent and cheese by 14 percent, which is directly attributed to the project interventions. Similar trends hold true for all study regions.

The project interventions largely contributed to enhancing on-farm incomes of the beneficiary farmers. Training, experience sharing visits, and business linkages created during the project have largely contributed to enhancing the business orientation of the farmers and participation in markets. This was witnessed by the increased incomes of the beneficiary dairy farmers.

Table 14. Annual average income (Birr/annum) earned from dairy products during baseline and end line

Regions	Livestock products	Baseline	End line	
			Beneficiary	Non-beneficiary
Amhara	Milk	6,182	16,984***	8,250
	Butter	739	2,055	2,407
	Cheese	86	1,353	-
Oromia	Milk	5,028	21,678 ***	3,210
	Butter	973	2,991	2,937
	Cheese	1,439	2,773**	2,252
SNNP	Milk	6,184	14,191**	10,267
	Butter	502	4,094***	2,722
	Cheese	164	3,933	4,225
Total	Milk	5,679	15,591***	9,595
	Butter	730	2,979*	2,693
	Cheese	901	2,966*	2,611

***, **, and * indicate the difference is statistically significant between the baseline and end line values at 1, 5, and 10 percent significance levels, respectively.

The choice of market outlets for dairy products is as diversified as crops. As presented in Table 15, 56 percent of the farmers sold dairy products in local markets at baseline. At end line, the proportion of dairy

farmers selling dairy products in local markets increased to 89 percent. This indicates that FEED III contributed to the increase in farmers selling dairy products in local markets by 59 percent. Even though less dramatically, the numbers of the beneficiary farmers selling dairy products at farm gate and through milk collection centers have also increased over the life of the project. This is evidence that market linkages created through trade fairs and B2B events contributed to the increased participation of the beneficiary farmers in markets.

Table 15. Dairy products selling places (%)

Market places for dairy products	Baseline	End line	
		Beneficiary	Non-beneficiary
Farm gate	6	13	12
Local market	56	89	90
Co-op/Union	0.3	2	0
Milk collection business	1.2	5	3
Milk processors	0.8	0.3	0
Other	0.5	2	0

3.3.4. Gender Role in Dairy Production

In Ethiopia, there is a gendered division of labor in most agricultural production systems, in which the livestock sector is not an exception. The end line data shows improvements in the engagement of women in some dairy production activities, while there are no significant changes in other activities (Table 50, Annex A). Before project interventions, the involvement of women in many dairy activities was limited because they did not have opportunities to get improved management practices.

During FEED III project interventions, focus was provided to women to enhance their knowledge and skills in improved dairy management practices. Women received trainings on various activities of dairy production. Because of this, the participation of women substantially increased in many dairy management activities during the project period. For instance, the proportion of women engaged in feeding cows was only 23 percent at baseline and 85 percent at end line. At baseline, 56 percent of women participated in cleaning of cows. At end line, this proportion increased to 93 percent, indicating the project's contributions to increasing the role of women in dairy production.

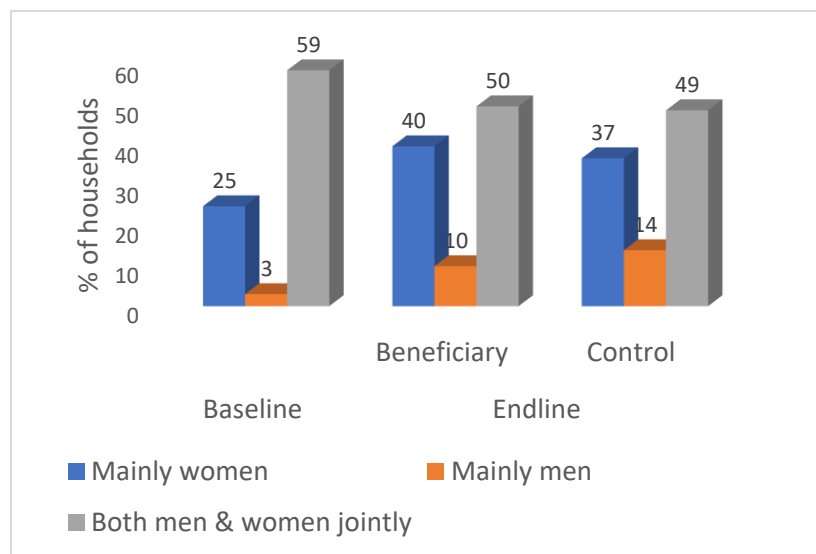
Note that increased involvement of women in livestock activities does not necessarily mean that women have benefited from them. In fact, increased involvement implies more work for women. However, some activities, like participation in selling of livestock products and decision-making over them, can positively contribute to women's welfare.

The engagement of women in dairy management activities was also enormous for women farmers drawn from non-beneficiary households. In most of the activities, the engagement of women from beneficiary and non-beneficiary households was observed to be similar at the end of the project. This might be attributed to a spillover effect of the project within the project implementation woredas. Information

exchange among women is believed to be high, because they meet frequently during social events and discuss training received and experience sharing visits.

In the context of Ethiopia, there are several informal community organizations established for various purposes, such as for get-together celebrations, to set labor arrangement mechanisms, to establish social supports, and to commence group savings. These platforms bring the members together at least once a week, allow them to discuss and share information about new events, technologies, and practices, and support the members who face problems. During those meetings, these organizations are essential avenues for resolving community disputes and spilling over new information from the source to other participants, whether project beneficiaries or not. It is also common for the participants (relatives and friends) who came from far away locations to participate in those events and learn new information and practices. It is likely that most participants apply the new information and practices when they return home.

Figure 1. Gender roles in decision-making of dairy products sale



Decision-making is an important role played by household members in the project areas. As illustrated in Figure 1, involvement of women in decision-making was 25 percent before FEED III interventions. After creating awareness on the importance of engaging women in decision-making, the proportion of women engaged in decision-making of dairy product sales increased to 40 percent. This indicates that FEED III contributed to the increased proportion of women engaged in decision-making by 60 percent. Even though joint decision-making is still dominant, the engagement of women in decision-making is increasing over time.

3.3.5. Challenges in Dairy Production

The baseline evaluation identified several problems which limit dairy production and productivity, as presented in Table 16. The same problems were assessed at end line. The prevalence of the problems declined over the life of the project in intervention and non-intervention areas.

For instance, shortage of concentrate feed was a problem for 59 percent of the farmers at baseline, and for 50 percent of the farmers at end line in intervention and non-beneficiary areas. For other problems listed in the table except access to credit and lack of technical knowledge on dairy management, there is no notable difference between beneficiary and non-beneficiary areas even though there is a decrease from the baseline.

This could be because of the spillover effect of the project as the non-beneficiary kebeles (villages) are within the same woredas⁴ (districts) and most of the problems mentioned are faced at the community or woreda level. Beneficiary and non-beneficiary farmers are from the same districts (woredas) but different villages (kebeles). There is high likelihood that non-beneficiary farmers in the same woreda but in different villages access or benefit from woreda-level interventions, such as availing feed supplies and introducing new feed. For some problems, the reduction can be because of other factors than the project interventions.

However, it is important to mention the tremendous contribution of the project to enhancing the knowledge and skills of dairy farmers. At baseline, the proportion of farmers having limited knowledge and skills of improved dairy management practices was 40 percent, which reduced to 10 percent for the beneficiary areas and to 16 percent for the non-beneficiary areas at end line. The difference from the baseline and from the non-beneficiary groups is statistically significant at a 5 percent significance level. This implies that FEED III managed to reduce the knowledge gap of the beneficiary dairy farmers by 38 percent, which can be attributed to project interventions.

These findings provide clear evidence that FEED III contributed to the reduction of many problems reported in the dairy sector. The project's engagement with feed manufacturing enterprises largely contributed not only to the increased availability of the concentrate feed, but also to the reduction of prices. Training and experience sharing visits related to improved dairy management practices also contributed to the reduction of other problems, such as animal diseases. Increased business orientation of dairy farmers also contributed to increased access to credit for productive investments.

Table 16. Trends of dairy production problems in the project periods

Problems reported	Baseline	End line	
		Beneficiary	Non-beneficiary
Shortage of concentrate feed	59	50	49
Land problem/limited land size	56	48	48
Disease prevalence	30	22	27
Lack of crossbred cows	33	31	34
Lack of cooling and storage facilities at milk vending sites	17	12	11
Water availability problem	27	13	16
Low milk price	23	20	18
High concentrate feed price	51	40	33
Lack of knowledge for modern dairy cow management	40	10	16**

⁴ Ethiopia has a four-tier administrative structure that runs from Federal, Regions, Zones (nominal in some regions), Woreda (district), and Kebele.

Problems reported	Baseline	End line	
		Beneficiary	Non-beneficiary
Limited access to credit	27	15**	9
Other	4	1.3	2.2

** indicates the difference is significant between beneficiary and non-beneficiary groups. NB: The difference between baseline and end line is statistically significant for all variables.

3.3.6. Adoption of Improved Dairy Feed

Improved dairy feed is very important for animal productivity. However, in Ethiopia the use of improved feed in dairy production is constrained by lack of supply, high prices, and awareness about it. FEED III trained stakeholders on quality dairy feed and facilitated its supply in the beneficiary areas. Table 17 indicates that the purchase of concentrate feed slightly increased over time. However, a higher proportion of farmers in beneficiary areas adopted dairy concentrate feed than in non-beneficiary areas. The table below shows there was a decrease in concentrate feed use in non-beneficiary areas, but the project prevented that decrease in beneficiary areas.

Table 17. Experience of purchasing dairy concentrate feed before and after the project

Regions	Baseline	End line	
		Beneficiary	Non-beneficiary
Amhara	19	18**	6
Oromia	17	7	5
SNNP	42	48**	16
Total	25	26**	8

** indicates the difference is significant between beneficiary and non-beneficiary group

Qualitative data indicates that FEED III introduced new technologies in dairy production, training on animal feeding, improving livestock production via improved feed management, animal feed preparation, concentrated feed, forage production, and maximizing animal productivity. The different types of forage provided to the beneficiaries were: Suspania, Rodes grass, elephant grass, and Dismodium in all intervention regions. As the FGD participant said, “After we were trained by the FEED III project, we started to feed concentrate feed to our cattle.” Consequently, there is a visible change in livestock production because of the training by FEED III. Most participants in FGDs agreed that there has been a dramatic change in animal feeding and forage production and preservation. This sentiment from the FGD participants was reinforced by key informants from the regional office as provided below:

“Before the training, the community knew nothing about improved forage types. There was only crop by-product to feed animals. After the training, they are demanding us to supply concentrate feed. The training also makes our task to introduce new technologies in livestock very easy. Now what is expected from us is supplying improved forage species and concentrate feed based on their interest.”

—Key informant from Region Livestock Development Agency

Concentrate feed is also available at the local level. For example, an agro-dealer in Chagni town, Guangua woreda distributes concentrate feed from Admas union. Gozamin union in Debre Markos town, east Gojjam, distributes concentrate feed to adjacent woredas, including Awabel.

In addition to access, the farmers also reported that while deemed essential, the price of the concentrate feed is high. The FGD participants reported that when they feed cows the concentrate feed, they produce more milk. As the FGD participants noted, because of the new technologies provided by FEED III, the farmers in the area secured animal feeding and received adequate income from livestock products like milk and butter.

According to the data, women are also involved in animal feed preparation, fattening, and dairy practices and are getting adequate income from livestock production. According to a male FGD participant's response, "Women are gifted in taking care of animals." Therefore, women feed animals on time and every activity in animal feeding is left for women. The only task of men is to harvest grass and bring it home.

3.3.7. Access to Concentrate Feed

Access to the feed is important for the adoption of improved animal feed. One of the measures of access is how the project improved the availability of the concentrate feed nearby. The data indicated a reduction in walking time to the closest dairy concentrate feed outlet in the beneficiary areas. For example, at baseline, an average dairy farmer walked more than one hour (70 minutes) to a concentrate feed supplier (Table 18). This time reduced to 47 minutes at end line, which is a 31% reduction. The reduction is the highest in Oromia at 56%.

Table 18. Average distance to concentrate feed sales point in walking minutes

Region	Baseline	End line	
		Beneficiary	Non-beneficiary
Amhara	55	51	108
Oromia	78	34	43
SNNP	74	47	65
Total	70	47	72

To further explore farmers' perceptions on the adequacy of the feed distribution channels, 14 percent of the farmers reported that feed distribution channels were adequate at baseline and 28 percent at end line (Table 19). This is clear evidence of the project's contribution to enhancing the availability of feed and feed distribution channels. This trend was true in all study regions.

In addition to physical availability, farmers were also asked whether they have access to dairy feed market information. The result indicates that the proportion of farmers, especially in the Oromia region, who accessed dairy feed market information tripled from 33 percent at baseline to 92 percent at end line. In other regions, the trend was declining. This may be because once the farmers received information from training and experience sharing visits, they may not tend to look for other sources.

Towards the end of the project, the main sources of dairy feed market information for beneficiary farmers were fellow farmers (41 percent), development agents (34 percent), and feed suppliers (41 percent), which have improved their delivery of information to dairy farmers compared to baseline.

Table 19. Perception of dairy farmers on the availability of concentrate feeds and feed market information (%)

Regions	Baseline	End line	
		Beneficiary	Non-beneficiary
Proportion of farmers who reported feed distribution channels are adequate (%)			
Amhara	28	38	25
Oromia	18	50	100
SNNP	0	22	25
Total	14	28	40
Proportion of farmers who access dairy feed market information (%)			
Amhara	40	31	0
Oromia	33	92	67
SNNP	83	40	38
Total	55	43	33
Source of information (%)			
Local feed traders	58	18	40
Feed suppliers	15	41	40
Development Agents	10	34	60
Fellow farmers	6	41	60
Community meeting	7	18	0

3.4. Animal Fattening and Value Chain

3.4.1. Animal Fattening

Participation by beneficiary households in animal fattening was one of the main contributors to the diversification of livelihoods across regions. The data showed that 31.4 percent of households were engaged in animal fattening at baseline and 29.2 percent of the sample (N=1,084) for the beneficiary households and 20.1 percent for non-beneficiary households in all regions at end line (Table 20). Hence, the participation in animal fattening was seriously affected by the pandemic, as inferred from the FGDs. On this account, the percentage difference between beneficiary and non-beneficiary households was statistically significant ($p < 0.01$), implying the role of FEED III in engaging households in animal fattening as one of the livelihood diversifications activities through the provision of feed management training (Table 20).

Table 20. Percentage of households reporting participation in animal fattening

Time	Comparison groups	Region			
		Amhara	Oromia	SNNP	All regions
Baseline		34.4	30.3	29.4	31.4
End line	Beneficiary	49.0	21.9	17.0	29.2
	Non-beneficiary	33.5	18.1	8.8	20.1
Chi-Square ^a					6.950 (.008)
Chi-Square ^b					.043 (.835)

^a chi-square test between beneficiary and non-beneficiary group at the end line evaluation

^b chi-square test between baseline and end line data

Table 40, Annex A, shows that 58 percent of households reported buying animals for fattening at baseline. At end line, the number of households purchasing animals for fattening was 179 (56.5 percent) for beneficiary and 63 (20.1 percent) for non-beneficiary households in all regions. This percentage varied from 82 percent in SNNP to 17 percent in Oromia, reflecting regional variations. To this end, there is no significant difference between baseline and end line studies, in general, and beneficiary and non-beneficiary households.

3.4.2. Access to Training for Animal Fattening

On the question of whether farmers have received training on animal fattening over the last 12 months, only 24.2 percent said yes at baseline. The government provided training for farmers in all regions except SNNPR, where some training was provided by private entities. The figure significantly increased across regions by end line. While the proportion of the project participants who received training in animal fattening increased to 93.7 percent, it reduced to 14.55 percent for non-project participants (Table 41, Annex A).

Poor access to markets, along with other factors which deterred farmers from engaging in animal fattening at baseline, was largely addressed by FEED III across regions. This is demonstrated by a statistically significant difference between the baseline and end line studies ($p < 0.001$), in general, and between beneficiary and non-beneficiary households, in particular ($p < 0.001$) (Table 41 Annex A).

Qualitative research also supported this finding. For example, a behavior change among the farmers is essential to the success of an initiative. Very few households were aware of forage and animal feed prior to training. After training, not only trained people, but also their neighbors and community are adopting new practices in forage and livestock production. Moreover, as conveyed by KII participants from the zonal and regional livestock offices, in addition to forage, the training included fattening, dairy, and poultry activities. Thus, *“The training had a dimension that made the community and our expertise informed of techniques to improve fattening, dairy, and poultry productivity. The trainees are most successful in fattening, especially fattening of oxen.”*

3.4.3. Purchase of Animal Concentrate Feed

About 40.6 percent of the households that participate in fattening across three target regions purchased animal concentrate feed at baseline and 33.4 percent of the project beneficiaries at end line ($p < 0.05$) (Table 42, Annex A). The shift may indicate an increase in purchasing factory by-products to fatten animals, which is attributed to training and support of the communities by FEED III, including video-assisted training, promotion of the concentrate feed, forage seed distribution, and improved forage technology. On the other hand, the overall reduction in the purchase of the concentrate feed for fattening is simply because fewer HHs are fattening animals.

At baseline, 14 percent of households across all target regions reported that feed distribution channels were adequate. At end line, 43 households (40.6 percent) reported them as adequate. The percentage

difference between the two datasets is statistically significant ($p < 0.001$) (Table 43, Annex A). Likewise, the percentage difference between beneficiary and non-beneficiary households is statistically significant ($p < 0.001$), suggesting that FEED III contributed to the expansion of feed outlets via participating farmer cooperatives and unions within the project intervention areas (Figure 2 and 3).

Figure 2. Dairy products and installed molasses tanker at Merkeb Union in Bahardar



A) Merkeb Union Bahir Dar; B) Installed Molasses Tanker

Figure 3. Upgraded conveyer in Amhara Region



3.4.4. Major Challenges Faced in Animal Fattening

Inadequacies in animal feed supply resulting from droughts and land use changes were identified as a major problem faced by animal fatteners across the regions at baseline via a multiple response survey. The second most frequently recorded problem with respect to animal fattening was inadequate animal health facilities. Limited animal health services were registered by 131 households in Amhara, 109 in SNNPR, and 99 in Oromia. The third biggest problem was competition between formal and informal traders (Table 44, Annex A).

The end line study reported an improvement in the concentrate feed quality and supply, and high concentrate feed prices remaining a problem. The latter may be due to inflation and severe currency shortages for some imported equipment. In support of this finding, one of the key informants in Awabel worda noted that, *“The main problem in the livestock sector is the problem of feed. Animal fattening is still traditional, and the relevant stakeholders have not given due consideration.”*

Despite this, the percentage difference between the two datasets and groups of households (beneficiary vs. non-beneficiary) in major challenges for concentrated feed to animal fattening, suggest that FEED III had impactful interventions. The project was successful at promoting participation by farm households in fattening as a viable livelihood option.

3.4.5. Coping Strategies for Feed Problems of Fattening Animals

Farmers reported using different strategies to compensate for inadequate supply of concentrated feed, including the use of other feed materials (78), shifting to own production (43), and reducing feed quantity (16). In a multiple response survey at baseline, the consequences of inadequate supply of concentrated

feed were stated as a decrease of fattening income (118), a decrease of fattened animals (81), and a decrease in meat quality (71).

At end line, the percentage of households who cope by reducing the amount of feed provided to fattening animals decreased to 7.7 percent, while those who cope by changing to their own production increased to 67.7 percent and those who use other feed materials decreased to 23.1 percent. On this account, the percentage differences between the two datasets and groups of households (beneficiary vs. non-beneficiary) in response to feed shortages for animal fattening was positive (Table 45, Annex A), indicating that FEED III was successful in achieving its intended objective. This is because, following FEED III training, beneficiary households gained expertise in producing their own feed. This implies the overall impact of the project in its intervention regions.

With regards to affordability of the concentrate feed for fattening animals, 11.5 percent reported it as affordable at baseline, and 23.6 percent of beneficiaries and 14.3 percent of non-beneficiaries at end line (Table 46, Annex A). In view of this, the interview participants noted that, *“The price of the products is a result of the rise in prices of raw materials.”*

In addition, according to Gozamin Union, the price of processed feed increased from Birr 550 (2016) to Birr 1,200 (2020) per quintal. Moreover, the average selling price in all unions became Birr 1,200, which is in line with the general price trend in the country. For example, immediately after the devaluation of Birr on October 10, 2017, the prices of almost all commodities and services sharply increased and resulted in a rise in the general price level (Korsa & Rajan 2018). Specifically, inflation measured in terms of the Consumer Price Index (CPI) increased by 3.4 percentage points from 12.2 percent in October 2017 to 15.6 percent in February 2018 (Central Statistical Agency (CSA) 2018). However, compared to the benefit of feed and the high customer demand, perhaps it was argued that the products are affordable since the demand was rising despite the rising prices over the last three years.

3.4.6. Price Fluctuation of Concentrate Feed for Fattening Animals

Price fluctuations of the concentrate feed for fattening animals are summarized in Table 47, Annex A. At baseline, 89 percent of households reported price fluctuations, versus 71.7 percent at end line for beneficiaries and 71.4 percent for non-beneficiaries. Because the percentage difference between the two datasets is statistically significant ($p < 0.01$), it signifies the effect of FEED III on price stability through various interventions, including establishing and supporting feed manufacturers and expanding feed distribution networks over the course of the project.

3.4.7. Feed Quality Check Methods

The proportion of farmers that check feed quality was 64.3 percent at baseline and 61.3 percent at end line (Table 48, Annex A). The reduction is not statistically significant at 5 percent significance level, indicating no change in the proportion of farmers that practiced feed quality checking between the two periods.

Table 49, Annex A shows that about 97 percent of those who checked feed quality at baseline did so through physical detection using indigenous knowledge, which is about the same as the proportion of non-beneficiary households at end line. For the beneficiaries, however, the percentage difference between the baseline and end line study was positive, indicating that the project beneficiary households used different approaches than those before FEED III interventions.

3.5. Poultry Production and Value Chain

3.5.1. Poultry Production

Poultry is one of the value chains that FEED III focused on over the last three years. The project supported poultry farmers in enhancing the practice of purchasing and utilizing commercial feeds. In Ethiopia, poultry products are mainly produced for sale to supplement farmers' on-farm income. At baseline, most farmers sold poultry products directly to customers. However, at end line, most farmers sold directly to retail traders. For instance, in Amhara, the proportion of households who sold to retail outlets was 10 percent at baseline and 63 percent at end line (Table 21). The same trend holds true for Oromia and SNNP.

However, the differences between beneficiary and non-beneficiary households were not statistically significant in all the study regions. This implies that the spillover effect benefited non-beneficiary households who established linkages with different markets with which they can negotiate better prices. This also indicates the increased market orientation of poultry farmers because of direct and indirect project support.

Table 21. Poultry production market outlet for baseline and beneficiary households (% of respondents)

Market outlets	Amhara			Oromia			SNNP		
	Baseline	Ben*	Non-ben	Baseline	Ben	Non-ben	Baseline	Ben	Non-ben
Consumers	83	31	26	57	38	35	44	33	33
Small retail outlets	10	63	65	40	60	65	44	67	67
Others	7	6	9	3	3	0	13	0	0
Chi-square (X^2)-test		P=0.114			P=0.430			P=0.968	

*Ben = Beneficiaries; Non-ben = non-beneficiaries

The farmers owned different types of chicken, including layers and broilers. Improvements are also observed over time in the project areas in the ownership status of different types of chicken. As revealed in Table 22, at baseline, poultry farmers owned a total of 4.6 chicken on average. After FEED III interventions, the average ownership of chicken for beneficiary farmers increased to 11.4, which indicates the contribution of the FEED III project by 148 percent compared to baseline. However, to figure out the attribution of FEED III, we need to apply the DID approach by considering the ownership status of non-beneficiary farmers. Accordingly, an average ownership of non-beneficiary farmers at end line was 9.2 chickens. This means the non-beneficiary farmers were able to increase chicken ownership by 4.6 on average without participation in the project. In terms of scale, FEED III exclusively enhanced ownership of beneficiary farmers by 2.2 chicken on average. In terms of proportion, FEED III enhanced chicken ownership status of all breeds by 24 percent.

From the perspective of improved chicken ownership, the findings revealed that total households on average owned 1.6 improved chickens at baseline. At end line, average ownership of improved chickens by beneficiary households was increased to 8.2, which indicates the contribution of the project by more than five-fold. On the other hand, ownership status of non-beneficiary farmers who did not receive any project support, reached 5.6 improved chickens. This implies that FEED III impacted beneficiary farmers to increase improved chicken ownership by three on average. This also means that FEED III increased improved chicken ownership of participant farmers by 54 percent.

Moreover, at baseline, households owned 2.0 improved layers and at end line, beneficiary households owned 5.9 and non-beneficiary households owned 4.1 improved layers. In terms of scale, FEED III impacted participant farmers to increase the number of improved layers owned by 1.8 on average. In terms of proportion, the project enhanced improved layers ownership of participant farmers by 44 percent. Other project effects can be interpreted in similar ways.

Non-beneficiary farmers demonstrated similar improvements as beneficiaries, mainly due to spillover effects, as described during FGD and KII discussion with men and women groups. This was noticed by statistically non-significant variations between beneficiary and non-beneficiary households in many parameters in the regions. The interventions made in the earlier phases of FEED projects (i.e., FEED I and FEED II), also contributed to FEED III achievements.

Table 22. Average number of household poultry ownership by region, 2020

Poultry type	Breed	Amhara				Oromia				SNNP				Total			
		BL	End line			BL	End line			BL	End line			BL	End line		
			Ben	N-ben	t-test (P-value)		Ben	N-ben	t-test (P-value)		Ben	N-ben	t-test (P-value)		Ben	N-ben	t-test (P-value)
Layers	Local	3.4	4.4	4.1	0.68ns	3.4	4.2	3.9	0.65ns	1.6	3.7	4.5	0.49ns	2.4	4.3	4.1	0.69
	Improved	1.9	5.4	3.6	0.15ns	0.7	6.5	4.2	0.47ns	1.3	5.6	5.1	0.78ns	2	5.9	4.1	0.02*
Broilers	Local	1.2	3.4	2.8	0.46ns	0.7	4.8	2.1	0.41	1.1	4.5	1.7	0.19	0.9	4	2.4	0.01*
	Improved	0.1	4.4	1.2	0.19	0	3.9	2	0.25	0.4	4.2	4.5	0.90	0.6	4.2	2.4	0.03*
Female chickens (over 3 months of age not laying - Pullet)	Local	1.1	3.5	3.7	0.79	1.9	5	3.5	0.51	0.4	2.1	2.4	0.68	1	3.5	3.3	0.78
	Improved	0.1	4.3	4	0.82	0.4	10.4	5	0.28	0.4	3.2	6.3	0.36	0.4	5.7	5.2	0.81
Male chickens (over 3 months of age)	Local	0.5	5.9	3.5	0.25	1	2.6	1.5	0.22	0.4	1	1.5	0.18	0.6	5.5	3.2	0.23
	Improved	0	3.7	1.2	0.04*	0.1	5.1	1	-	0.3	3.2	3.6	0.84	0.2	3.9	2.1	0.08
Chicks (up to 3 months of age)	Local	2.3	8.2	8.1	0.99	2.4	5.2	2	-	0.4	6.6	2	0.07	1.5	7.7	7.6	0.90
	Improved	0.2	9.5	9	0.84	0.2	4.6	0	-	0.1	4.8	8	0.69	0.3	7.1	8.5	0.63
Total	Local	5.2	10	10.6	0.58	3.9	6.5	4.4	0.02**	1.5	8.2	8.2	0.99	3	8.9	8.6	0.76
	Improved	1.4	7.5	4.6	0.002**	0.6	8.5	4.5	0.01**	1	9.2	11.3	0.51	1.6	8.2	5.6	0.005**
	Total	6.6	12.1	10.7	0.19	4.5	10	5.6	0.006**	2.5	12	12.7	0.80	4.6	11.4	9.2	0.008**

BL=Baseline EL=end line Ben=Beneficiaries N-ben=non-beneficiaries

P=Probability, ns=Non-significant (P>0.05), *=P<=0.05, **=P<0.01

Farmers feed different types of feed to their chickens, out of which grain is most common. However, the practice of using layers feed was minimal. At baseline, the proportion of farmers using layers feed was 14 percent (Table 23). After FEED III training on the importance of feeding improved layers feed, the proportion of beneficiary farmers who used this feed increased to 27 percent. However, it was reported that non-beneficiary farmers did not provide layers feed to their chickens. This implies that FEED III contributed to the increment of the layers feed beneficiaries by 93 percent. Beneficiary farmers received training through FEED III on different types of chicken concentrate feed.

Table 23. Types of concentrate feeds fed to chickens in the last 12 months at the time of baseline (2018) and end line (2020) studies (% of households)

Concentrate feed types	Amhara				Oromia				SNNP				Overall		
	BL*	Ben	Non-ben	X2-test	BL	Ben	Non-ben	X2-test	BL	Ben	Non-ben	X2-test	BL	Ben	Non-ben
Grain	88	75	91	0.008**	69	71	86	0.65ns	82	51	75	0.54ns	81	70	89
Layers feed	7	24	9		21	27	0		18	39	0		14	27	0
Broilers feed	5	1	0		1	1.3	14		0	8	0		2	2	5

*BL=Baseline, Ben=Beneficiaries, Non-ben=Non-beneficiaries

Farmers adopted different types of management practices for poultry production. As illustrated in Table 24, scavenging supplemented with home grains appeared to be the most common poultry management practice for beneficiary and non-beneficiary farmers. After project interventions, the practice of using scavenging supplemented with commercial feed became common for 17 percent of beneficiary farmers and for 11 percent of non-beneficiary farmers, compared to 7 percent at baseline. This serves as evidence that FEED III was effective at raising awareness of farmers on improved management practices of poultry farms.

Table 24. Types of management practices applied to poultry production (% of respondents)

Management practices	Baseline (2018)	End line		
		Beneficiary (2020)	Non-beneficiary (2020)	X ² -test
Scavenging	30	18	27	P=0.02*
Scavenging supplemented with home grains	50	47	47	
Scavenging supplemented with commercial feed	7	17	11	
Full feeding with home grown grains	13	16	13	
Full feeding with commercial feed	0.2	0.7	2.6	

The major poultry product for rural households are eggs, which are an important source of cash, especially for women and youth. During the life of the project, egg productivity varied from year to year. As exhibited in Table 25, the productivity of local chickens was 37 eggs per clutch at baseline and 44 eggs per clutch for the beneficiary farmers at end line, including the project's contribution of 19 percent. A spillover effect of the project also contributed to the increase in egg productivity for non-beneficiary households, which was demonstrated by statistically non-significant differences between beneficiary and non-beneficiary households. This implies similar performances between beneficiary and non-beneficiary households.

Table 25. Annual average poultry egg productivity per hen (egg/clutch and egg/year) by breed

Region	Local per clutch				Local per year				Improved per year			
	BL	Ben*	Non-ben	t-test (P)	BL	Ben*	Non-ben	t-test (P)	BL	Ben*	Non-ben	t-test (P)
Amhara	46	23	22	0.94	102	105	117	0.26	107	88	106	0.44
Oromia	34	87	28	0.01*	132	143	106	0.12	63	65	53	0.51
SNNP	28	48	99	0.47	85	121	146	0.67	84	80	133	0.44
Total	37	44	30	0.15	106	116	117	0.99	88	78	88	0.52

*BL=Baseline, Ben=Beneficiaries, Non-ben=Non-beneficiaries

Poultry farmers have options for market outlets to sell their products. As provided in Table 26, a local market is the most common outlet for poultry products for all farmers before and after the project. FEED III provided training and advice to poultry farmers on how to link with market outlets to sell their products. Since there is no statistically significant difference between beneficiary and non-beneficiary households, the project had a positive spillover effect not only on the beneficiaries but also on non-beneficiary households.

Poultry farmers supplement on-farm income by selling poultry products, such as eggs, hens, and other chickens. Household-level income from poultry products revealed various trends over the years in the project areas. As presented in Table 27, farmers generated a total annual income of Birr 3,168 from the sale of poultry products before the project. Towards the end of FEED III, this income increased to Birr 4,848. On the other hand, non-beneficiary farmers generated Birr 3,203.3 annually from the sale of poultry products. This implies that FEED III enhanced the incomes of poultry farmers by 51 percent. This is evidence of the project's impact on the household economy. Egg market price increases during the project period also contributed to income growth for poultry farmers. The income generated from the sale of poultry products helps to improve livelihoods of beneficiary households and strengthen the resilience of households to withstand unexpected shocks.

It was not only the revenue which increased in the last three years, but also the quantities of the poultry products sold. For instance, poultry farmers at the beginning of the project sold 307 eggs annually on average. At end line, the beneficiary farmers increased the number of eggs sold annually to 567. On the other hand, non-beneficiary farmers sold 394 eggs at end line. Still, there is a statistically significant difference between beneficiary and non-beneficiary farmers in annual egg sales. This implies that FEED III increased the number of eggs sold by beneficiary farmers by 44 percent.

Table 26. Market outlets where farmers sell poultry products (% of respondents)

Market outlets	Baseline	End line		X ² -test
		Beneficiary	Non-beneficiary	
No sale	0	7	9	P=0.84
Farm gate	6	10	11	
Local market	84	83	81	
Co-op/union	0	0.2	0	
Private enterprises	0.2	0.2	0	

Table 27. Average annual sales (No.) and revenues (Birr) of poultry products per household in 2018 and 2020

Poultry type	Particulars	Amhara				Oromia				SNNP				Total			
		BL	Ben	Non-ben	t-test (P)	BL	Ben	Non-ben	t-test (P)	BL	Ben	Non-ben	t-test (P)	BL	Ben	Non-ben	t-test (P)
Hen	Quantity	3.5	9.8	5.2	0.30	4.8	61.5	15.1	0.06	3.1	39.0	3.0	0.15	5.4	33.1	8.1	0.01**
	Revenue	415.4	843.2	640.6	0.20	789.8	1,115.9	536.7	0.01**	370.9	1,130.4	530.0	0.19	1,002.	988.8	602.9	0.003**
Male chickens	Quantity	2.5	9.2	3.8	0.25	4.1	5.0	2.6	0.17	2.4	4.5	4.3	0.91	4.9	7.3	3.5	0.17
	Revenue	391.2	1,005.5	681.3	0.02*	740.6	1036.4	775.7	0.10	459.5	1,650.8	1,566.7	0.91	885.5	1,097.1	749.9	0.005**
Female chickens	Quantity	3.4	3.3	2.9	0.58	5.6	7.5	2.5	0.20	2.5	2.7	0	-	4.4	4.5	2.9	0.20
	Revenue	299.9	489.1	433.3	0.63	621.9	1781.8	325.0	0.13	335.0	631.2	0	-	483.9	927.8	420.6	0.09
Eggs	Quantity	349.2	487.8	349.7	0.02*	168.3	690.1	466.1	0.12	363.8	500.8	405.5	0.72	307.4	567.5	394.8	0.009**
	Revenue	760.5	1,723.9	1,332.1	0.05*	537.3	2063.9	1,534.8	0.13	945.0	1,557.7	1,651.6	0.92	796.1	1,834.3	1,429.9	0.03*
Average revenue		1,867	4,061.7	3,087		2,690	5,998	3,172		2,111	4,930	3,748		3,168	4,848	3,203	

*BL=Baseline, 2018 Ben=Beneficiaries Non-ben=Non-beneficiaries P=Probabilities

To strengthen the poultry sector, various organizations trained rural households in improved poultry production practices. At end line, 83 percent of all beneficiary poultry farmers reported having received training from FEED III on improved poultry management practices (74 percent in Amhara, 96 percent in Oromia, and 85 percent in SNNP). In fact, almost all beneficiaries are believed to have received training from the project, and the farmers reported what they recalled. During the same period, the proportion of non-beneficiary farmers who received trainings from other organizations was only 8 percent (8 percent each for Oromia and Amhara, and 18 percent for SNNP).

Governmental and non-governmental organizations provided training to farmers. Three years ago, at baseline, the government was the main provider of training through its agricultural extension services. At end line, ACIDI/VOCA became a prominent provider of farmer training. Out of all training providers, 41 percent were government, followed by ACIDI/VOCA at 39 percent. The contribution of ACIDI/VOCA was high in the Oromia region, accounting for 68 percent, while the government accounted for 17 percent (Table 28).

The poultry sector is facing several challenges. Three years ago, in 2018, the main challenge facing farmers in poultry production was chicken disease followed by predators (Figure 10, Annex A). Three years later, in 2020, the main problem appeared to be predators, while the effect of chicken diseases was reduced. This indicates that the farmers have largely managed to control chicken diseases after the project. Trainings provided by ACDI/VOCA and other development partners have raised farmers' knowledge and skills on how to take care of chickens and minimize disease occurrences. This can be taken as evidence of positive contributions made by NGOs and other development partners in the poultry sector.

Table 28. Training providers on improved poultry production

Training providers	Amhara		Oromia		SNNP	
	Baseline	End line	Baseline	End line	Baseline	End line
Co-op/union	0	0.6	0	7	0	7
Private enterprises	1	4	1	11	7	13
Government	22	35	16	17	15	41
ACDI/VOCA	2	61	1	68	1	39

3.5.2. Poultry Concentrate Feed and Value Chain Actors

The poultry production value chain involves a range of actors who play various roles. At baseline, the main actors to poultry farmers were traders and village-level consumers, especially in Amhara (7 percent) and SNNP (17 percent) (Table 29). In Oromia, however, village-level consumers (4 percent) and local middlemen (3 percent) were the main actors for poultry farmers.

After the project intervention, traders were key actors for 61 percent of the poultry farmers. Linkages of poultry farmers with traders were strong in all the study regions. At end line, the highest proportion of poultry farmers who had strong linkages with traders was 73 percent in SNNP, compared to 17 percent at baseline. In Oromia, 50 percent of the farmers have established business linkages with traders compared to 1 percent at baseline, which means this was a new experience for them. In Amhara, 40 percent of the farmers have business linkages with traders, which is high compared to only 7 percent at baseline. Training and other support provided by FEED III is believed to have largely contributed to the increase in the business orientation of the poultry farmers.

Table 29. Main value actors for poultry production (%)

Actors	Amhara		Oromia		SNNP	
	Baseline	End line	Baseline	End line	Baseline	End line
Consumers at village level	6	30	4	13	7	13
Traders	7	40	1	50	17	73
Rearing centers	1	0	0	6	0	0
Local middlemen	1	0	3	19	1	0
Commercial farmers	3	20	0	6	4	10

3.5.3. Feed Millers and Concentrate Feed Producers

Poultry farmers purchase and use feed of different types for different chicken breeds. However, the quantities and costs incurred vary over time. In 2018, the farmers of the Amhara region purchased 88kg of layers feed and only 22kg in 2020. In 2018, they purchased 150kg of broiler feed, and no broiler feed in 2020. They purchased 12kg of grain in 2018 and 157.5kg in 2020. Their feed preferences seem to have changed. They switched to grain, which is more available from their own stock. During FGD, farmers stated that using grain from their own stocks helps to minimize feed costs and maximize benefits from poultry production.

On the other hand, poultry farmers of Oromia and SNNP have increased the purchase of layers and broilers feed. For instance, the farmers of Oromia purchased 56kg of layers feed in 2018 and 486kg in 2020, an eight-fold increase. The same trend holds true for SNNP. Training and support provided by FEED III is believed to have helped the farmers select the best type of chicken feed available at their locations.

During FGDs with beneficiary farmers in the Amhara region, they described the cost issues as follows:

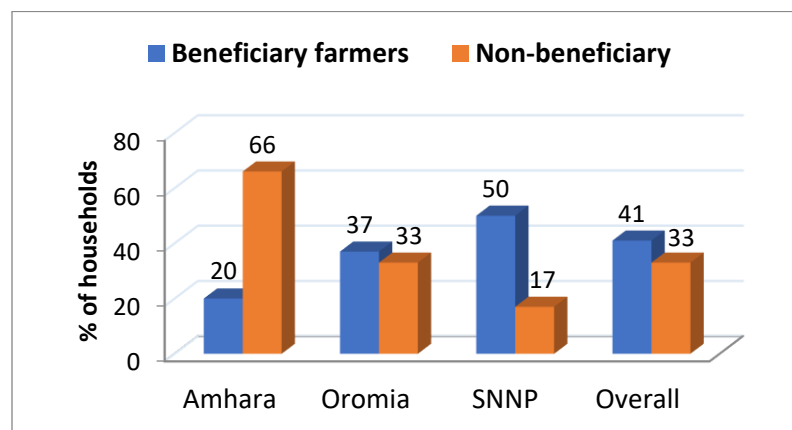
*“To solve feed problems, VOCA⁵ has supported us in creating access to concentrate feeds. VOCA helped us establish linkages with concentrate feed processing enterprises which are available in our nearby towns. For instance, there is an animal feed manufacturing factory owned by Jemal*⁶ in Adet town. We noticed that the concentrated feed is very helpful, but the price is high. When we feed concentrated feed to cows, they give much milk than the usual, when we feed hens, they lay eggs consecutively and if we feed oxen, they are getting fat within a short period of time. However, we felt that the price is high because of the high cost of inputs and taxation, but if we see the benefit it gives, the price is reasonable.”*

The end line assessment of the poultry production and value chain interventions reveals that FEED III made substantial contributions to establishing and enhancing the capacities of poultry feed processors. This was manifested in the increased proportion of farmers accessing concentrate feeds. The proportion of farmers who reported the availability of concentrate feed as adequate, increased during FEED III. Business orientation of the poultry farmers has also increased in the last three years. The farmers’ revenue has also increased from the sale of poultry products during FEED III.

⁵ Local community and other actors call ACDI/VOCA as VOCA.

⁶ *Alias used for privacy.

Figure 4. Affordability of concentrate feed for poultry production



Poultry farmers fed purchased commercial and home-grown feeds to their chickens. In most cases, there is a concern that the prices of concentrate poultry feeds are unaffordable. This is because feed ingredients represent close to 90 percent of the cost of the manufactured concentrate feeds. Those ingredients are purchased by manufacturers like FEED cooperative unions from other suppliers like flour factories. As a result, much of the price escalation in concentrate feed price is beyond the non-beneficiary of feed manufacturers. As illustrated in Figure 4, concentrate feed is affordable to 41 percent of the beneficiary farmers and 33 percent of non-beneficiary farmers. This might be attributed to the increased economic capacity of the beneficiary farmers because of FEED III support.

Poultry feed prices are not stable and tend to fluctuate in response to various externalities. According to 68 percent of the beneficiary and 50 percent of non-beneficiary farmers, the prices of commercial concentrate feeds fluctuated over time. When purchasing concentrate feed, 57 percent of beneficiary farmers checked its quality. It was noted that 97 percent of the beneficiary farmers checked feed quality through physical inspection using indigenous knowledge. Only 3 percent of beneficiary farmers used poultry experts to check the quality of commercial concentrate feeds through physical detection.

3.5.4. Gender Perspectives in Poultry Production and Management

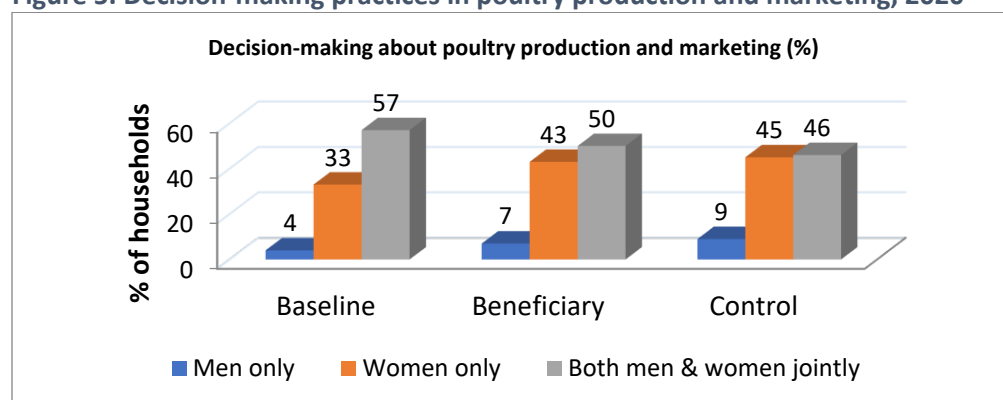
During the life of the project, the engagement of women in decision-making became substantial, which could be attributed to the project's efforts in raising awareness on the importance of engaging women in development activities. At the beginning of the project, the proportion of women who were engaged in decision-making on matters related to poultry production and marketing was 33 percent. At the end, the proportion of women decision-makers increased to 43 percent, which is a 30 percent difference (Figure 5). The proportion of women engaged in decision-making was also substantial for non-beneficiary farmers, which could be attributed to spillover effects of FEED III. During FGDs with groups of women, it was revealed that information exchange among women is considerable in the community. The women participants described this as follows:

"There are many social occasions where we meet and discuss various matters related to market, prices, disputes among individuals, new things learned from trainings or exposures,

new things learned from observations and communications, and many household matters. If there are women who got access to training or visits, they share with us what was said, what they observed and what they heard. Then, we brainstorm the issue and seek each other's advice if we can also apply this at home. When we meet next time at social events or on any occasions, then we share feedback on what we experienced."

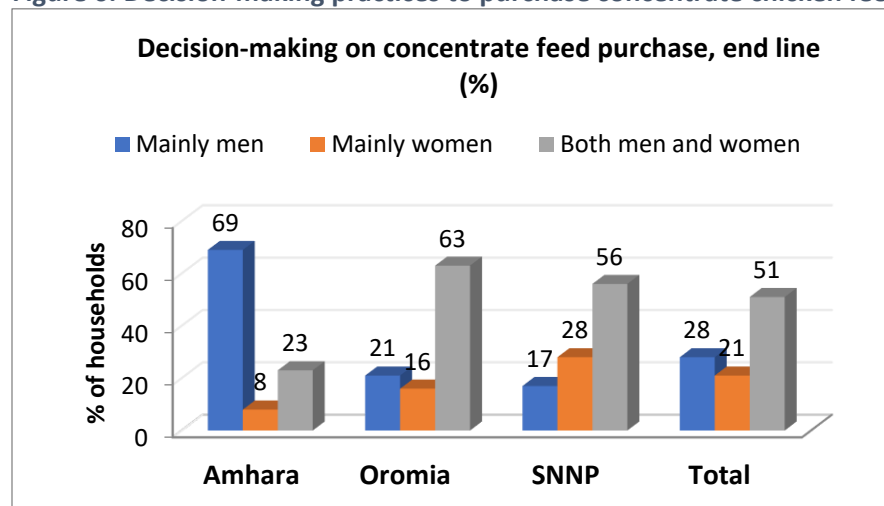
From the above transcription, we realize how informal social setups help the community, in general, and women, in particular, for fast information exchange on new technologies, practices, and events. Informal community setups can also be organized by gender (i.e., men-only or women-only organizations). In the context of Ethiopia, women-only organizations established for various purposes, are greater in number than men-only organizations. This gives women an opportunity to meet frequently, at least once a week. Apart from the main purpose of the meeting, women discuss various matters happening around them, things that they observed, heard, and experienced, as well as the outcomes. This provides an opportunity for other women (whether project beneficiaries or not) to learn and experience new things.

Figure 5. Decision-making practices in poultry production and marketing, 2020



FEED III has been focusing on gender perspectives in various components. Improvements were also manifested in participation and decision-making practices. As illustrated in Figure 6, 51 percent of the overall households experienced joint decision-making with consultation of men and women. The Oromia (63 percent) and SNNP (56 percent) regions depend on joint decision-making of both men and women. However, the experience of the Amhara region is quite different in that 69 percent of the households reported men to be the dominant decision-makers in the purchase of concentrate feeds.

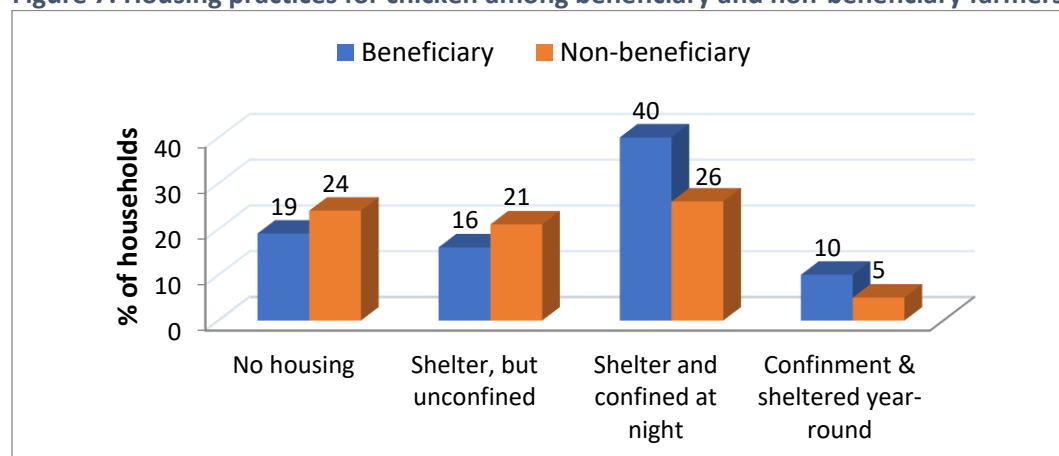
Figure 6. Decision-making practices to purchase concentrate chicken feeds, 2020



3.5.5. Sheltering Practices in Poultry Production

The proportion of farmers who sheltered their chickens in a confined place at night was 25 percent at baseline and 40 percent for beneficiary and 26 percent for non-beneficiary farmers at end line (Figure 7). This indicates that FEED III contributed to the increased proportion of farmers who adopted sheltering chicken in confined places at night by 60 percent. Training provided by FEED III inspired beneficiary farmers to improve poultry management practices, including improved housing and feeding. The type of shelter used in poultry farming is an indication of the business orientation of the farmers. The percentage of farmers that did not use any shelter for chicken reduced from 45 percent at baseline to 19 percent at end line (Figure 7).

Figure 7. Housing practices for chicken among beneficiary and non-beneficiary farmers, 2020



3.6. Forage Production and Feed Value Chain

Development interventions by FEED III contributed to the increased business orientation of the farmers

engaged in livestock production. This, in turn, motivated the farmers to adopt livestock technology packages, one of which is improved forage. As the findings indicate, only 9 percent of farmers participated in forage production at baseline (Table 30). After three years of project interventions, the proportion of farmers participating in the production of forages increased to 30 percent. This means that the project contributed to the increase of forage growers by more than threefold. At end line, 11 percent of non-beneficiary farmers were also engaged in forage production. The difference between beneficiary and non-beneficiary households is statistically significant, which implies that the proportion of farmers engaged in forage production truly increased over the life of the project. Using the DID approach, FEED III increased the number of forage growers by 173 percent.

Table 30. Households' engagement in forage production before and after the project (% of households)

Region	Baseline (2018)	End line (2020)		
		Beneficiaries	Non-beneficiaries	X ² -test
Amhara	8	34	8	P<0.001***
Oromia	3	7	4	P=0.122
SNNP	26	48	21	P<0.001***
Total	9	30	11	P<0.001***

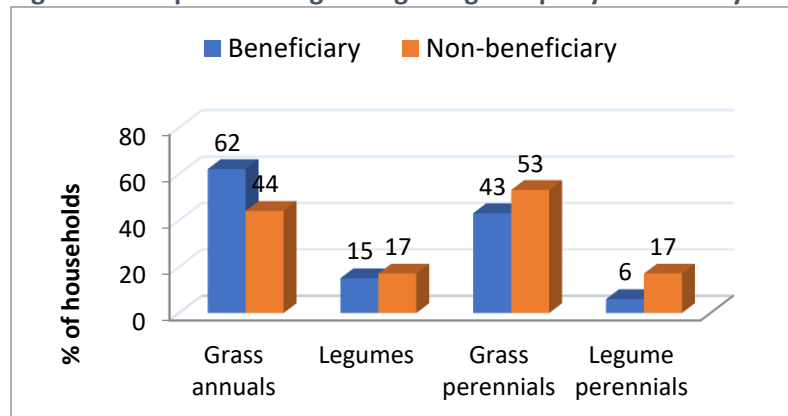
Beneficiary and non-beneficiary farmers experienced growing different types of forage crops. As presented in Figure 8, the proportion of famers who grow grass annuals was higher for the beneficiary (62 percent) than non-beneficiary (44 percent) farmers. For other feed types, non-beneficiary farmers have better experiences of growing forages than beneficiaries. Growing forage crops was not a common practice of farmers before the project. FEED III provided training to beneficiary farmers on different types of forage crops, including grass annuals, and this may have contributed to more farmers adopting such forages. It was also recognized that spillover effect has motivated neighboring farmers to adopt some of the forage crops.

During FGDs with beneficiary farmers of the Amhara region, they were inspired by the supports of the FEED III project in addressing critical feed shortage problems. They expressed their impressions in the following ways:

"The project introduced us to new and specialized forage types. Moreover, we got ample knowledge about livestock production and its improved management practices. The training was so attractive because it was video-aided, and we may not forget it easily. The training totally changed our thoughts we had on animal feeding. How could we think that a grass can be sown and grown on our farmland as food crops? Now, we have realized its importance and started growing different types and allocated about a quarter to half a hectare of land for forage crops. We have also received trainings on how to use crop by-products properly. We used to be selective in collecting our crop by-products. For example, Niger by-product, wheat by-product, maize by-product, and so on, were not collected and they have been strewed on the field. However, these days, any crop by-product is collected and treated with Urea treatment. We also built shelter to keep crop by-products safely and we avoided dissipation during feeding. Because of these new practices, our feed problem is getting solved now. Thanks to VOCA that this time, not only us who took the training, but also our neighbors, are aware of the benefit of planting specialized

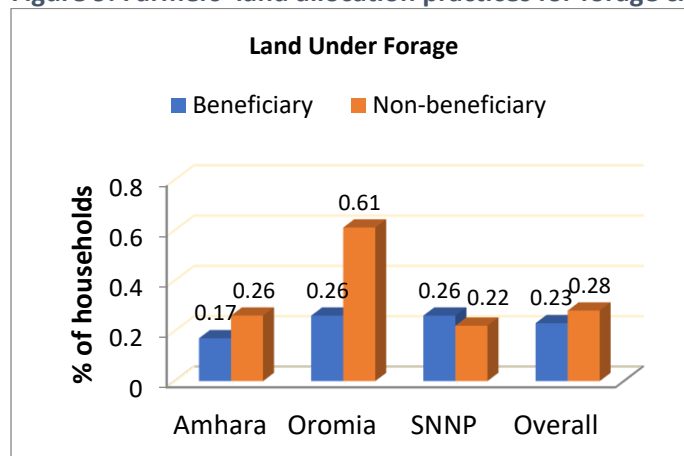
forage crops and they have even started growing some of the forage crops.”

Figure 8. The practice of growing forage crops by beneficiary and non-beneficiary farmers, 2020



At the time of the baseline study, overall sample households allocated 0.25ha of land on average for the growth of forage crops (0.52ha for the Amhara region, 0.61ha for Oromia, 0.15ha for SNNP). As provided in Figure 9, non-beneficiary farmers seem to allocate more land for forage production compared to beneficiaries. For instance, while beneficiary farmers allocated 0.23ha of land for forage growth, non-beneficiary farmers allocated 0.28ha. This might be because beneficiary farmers focus on enhancing productivity from small plots through the application of improved forage technologies, such as high yielding forage varieties and improved agronomic management practices. The FEED III project has been providing trainings to beneficiary farmers on how to enhance productivity of forage crops using improved packages of technologies. Because of this, beneficiary farmers allocated small plots for the growth of forage crops as the focus is on enhancing productivity per unit of land.

Figure 9. Farmers’ land allocation practices for forage crops, 2020



Apart from engagements in forage production, FEED III project and other development partners have also been supporting farmers through capacity development initiatives.

At the time of baseline study, the proportion of farmers who had received training on improved forages was 36 percent (Table 55 in Annex A). After three years, the proportion of training recipients increased

to 94 percent, or by more than two folds. In all the study regions, the FEED III project and its partners have contributed to 58 to 66 percent of the farmers having access to trainings on improved forage management practices.

The source of improved forage planting material was government (Office of Agriculture) for 62 percent of the farmers and NGOs, such as ACDI/VOCA, for 27 percent of forage growers. Before the project's three years, the contribution of NGOs as a source of planting materials was only 8 percent. This implies that the FEED III project has allowed for 19 percent of the farmers to get planting materials.

Farmers have been receiving trainings on improved forage production and management from various organizations. At the time of baseline, the government (Office of Agriculture) was observed to be the major provider of trainings (Table 31) and the contribution of NGOs was minimal. After three years, the major provider of trainings on improved forage is NGOs, mainly ACDI/VOCA through its FEED III project. It was reported that 98 percent of the overall farmers have received trainings, mainly through the project, which is evidence for the substantial contribution of ACDI/VOCA in enhancing the knowledge and skills of forage production and management. Even though women are also involved in the production of forages, the proportion of training recipients was higher for men in all the study regions. The proportion of men who received the training on improved forage production and management was higher for Amhara (94 percent) compared to the Oromia (87 percent) and SNNP (63 percent) regions. Providing training opportunities for women was higher in the SNNP region (37 percent) compared to Oromia (13 percent) and Amhara (5 percent).

Table 31. Actors involved in providing improved forage trainings

Actors	Amhara		Oromia		SNNP	
	Baseline	End line	Baseline	End line	Baseline	End line
Government	7	3	2	0	73	2
NGO	4	0	0	0	8	0
ACDI/VOCA	0	96	0	100	0	99

Feed is the major limiting factor in livestock production. Despite the efforts made to address the problem, feed scarcity still appears as the major constraint. Before commencement of the FEED III project (2018), almost no one had produced adequate quantity of forage feed types (Table 32). After the FEED III project intervention, the proportion of farmers who reported having adequate quantity of forage feed types has increased to 50 percent, which is clear evidence of the FEED III project's contributions (Table 33).

Table 32. Forage adequacy status and its effects (% of households), baseline (2018)

Region	Forage adequacy	Strategy for way out in case of inadequacy		Consequences of feed inadequacy		
	Adequate	Reduce quantity given	Start own production	Reduce product quality	Reduce product quantity	Reduce income
Amhara	1.2	20	80	20	60	20
Oromia	0	0	0	0	0	0
SNNP	1.6	29	71	14	57	29
Total	0.73	25	75	17	58	25

Table 33. Forage adequacy status and its effects (% of households), end line (2020)

Region	Forage adequacy	Strategy way out in case of inadequacy		Consequences of feed inadequacy		
	Adequate	Reduce quantity given	Start own production	Reduce product quality	Reduce product quantity	Reduce income
Amhara	58	28	44	28	19	42
Oromia	10	22	78	0	11	89
SNNP	25	11	55	11	11	67
Total	50	24	52	20	17	54

The status of forage production is improving since interventions made by the FEED III project. However, there are still problems in addressing forage scarcity adequately. At the time of the baseline study (2018), the major problems were shortage of land, lack of improved forage seeds, and lack of water for irrigation (Table 56 Annex A). These factors persisted and remained critical after three years.

Nevertheless, the FEED III project has contributed to the reduction of some of the problems. For instance, the proportion of farmers who reported shortage of improved forage seeds was 59 percent before three years. After interventions made by the FEED III project, the proportion of farmers who reported shortage of improved forage seeds was reduced to 39 percent. This means the project has contributed to reduction of improved forage seed shortage by 34 percent. This is also evidence of the FEED III project creating households' access to improved forage seeds.

Different types of forage crops were introduced by FEED projects and other development partners. According to the baseline study that was conducted before three years (2018), the proportion of farmers who planted elephant grass was 39 percent (Table 57 in Annex A). After three years of interventions by the FEED III project, this proportion was raised to 62 percent. This provides evidence that the FEED III project has contributed to increasing households' access to elephant grass by 59 percent.

Similarly, the proportion of farmers who have been growing sesbania before the FEED III project was 5 percent. After the FEED III project, this proportion was raised to 15 percent. In this case, the project has contributed in increasing sesbania growers by three-folds.

During FGDs and KIIs with beneficiary farmers of the Amhara region, participants shared the following ways they changed their attitudes regarding forage crops:

"How could we think that a grass can be sown and grown on a farmland? It was difficult to accept, and we did not recognize the advantages of planting a grass in our yard. But after we took trainings, we started to believe that forages could be helpful in addressing feed problems. First, we started by planting Elephant grass around our courtyard as fencing for our compound. Later, we started to see and witness its benefits as animal feed. Then we expanded it. After the FEED III project gave us the training, we even started searching for more different types of grasses and we requested Development Agents (DAs) to bring us seeds and seedlings of these types of grasses. It was difficult to adapt Rhodes at initial stages because its seed was difficult to sow. However, this time, we have become familiar with how to manage it and it is getting productive. So, this project

has helped us change our earlier thoughts and learned that a grass can be sown and that we confirmed it. Our feed problem is now getting solved.”

The above transcription reveals the attitude farmers were having before the FEED III project and how their thoughts changed as they receive trainings and observed demonstrations. Their demand for forage crops has been raised and they are even looking for more forage seeds and seedlings. According to survey respondents, there are some farmers who already allocated a quarter to a half hectare of land to grow forages, as presented in earlier sections.

3.6.1. Forage Production and Nursery Establishment

Farmers require different types of forage inputs, most of which are commercially purchased and include seeds and seedlings. As revealed in Table 15 in Annex A, 9 percent of the beneficiary farmers have purchased forage inputs, while this proportion is 7 percent for non-beneficiary farmers. This means, not only the FEED III project beneficiaries, but also non-beneficiaries have experienced purchasing forage inputs. The supports made by the FEED III project through trainings and other interventions is believed to have contributed to farmers engaging in forage production. The household decision to purchase forage inputs was mainly the responsibility of men in 73 percent of the beneficiary households, while it is women in 27 percent of the households. The same trend holds true for non-beneficiary households, revealing male dominance in decision-making.

Farmers had options for sources from which to purchase forage inputs in the last 12 months. As indicated in Annex C10, 51 percent of the beneficiary households sourced forage inputs from government (Office of Agriculture), followed by farmer-to-farmer exchange through which 25 percent of the farmers sourced forage seeds and seedlings. The contribution of ACDI/VOCA through its FEED projects has also been a source of forage inputs for 12 percent of the farmers. ACDI/VOCA has especially been a major source of forage inputs for 67 percent of the farmers in the SNNP region.

Forage is still scarce for another 50 percent of the beneficiary farmers, even though the FEED III project has created adequate access to half of the beneficiaries. The major reason for this shortage was attributed to high input prices, as reported by 61 percent of the farmers (Figure 17 in Annex A). Availability of forage inputs, such as seeds and seedlings, are also still a problem for 26 percent of the households. These should be one of the focus areas for subsequent development interventions in the feed sector.

During FGDs with beneficiary farmers, some expressed the feed problem they had and how they addressed it in the following ways:

“In our surrounding, there was not enough grazing land, and we were suffering a lot in search of feed for our animals. After we got involved as beneficiaries, we received not only trainings but also seeds and seedlings of improved grass types, which helped us solve animal feed problems. When we see some of our neighbors, they are still suffering from acute feed problems.”

The Feed II project had established about 23 nurseries in the project sites of SNNP, Amhara, Tigray, and Oromia. Various species of forage crops were planted in these nursery sites. High demand has also been

created from farming households through trainings offered by the FEED III project. The TOT training was provided to Woreda and Zonal Agriculture Experts and DAs, which was later cascaded to farmer beneficiaries. The focus of the FEED III project has been raising awareness of beneficiary households on the importance of growing forage crops for enhancing livestock production and productivity. Once this awareness is created and demand is raised, the farmers themselves (especially those with access to irrigation) started planting forage seeds and seedlings on their own plots of land. They also purchased concentrate feeds with their own cash. This was mainly due to attitudinal changes of farmers on the importance of growing forages on farmlands.

The FEED II project had also been supporting private enterprises to produce and distribute forage seeds and other feed products. The FEED III project established linkages of these enterprises with beneficiaries through organizing events, such as B2B workshops and trade fairs. Experience sharing visits were also organized during the FEED III project. This has further enhanced the demands of farmers for forage crops and feed products. Once they plant forages on their own plots, they have also been receiving technical supports, especially from DAs and model farmers.

The study team made visits to one of the nursery sites in the Amhara region, Dembecha nursery. It was recognized that as the FEED III project is phasing out, the Woreda Agriculture Office is taking over to manage the nursery site. Four employees were engaged on this nursery site, operating the day-to-day activities. Elephant grass, Dinsho, Setaria, punicum, Dismodium, and Alpha-Alpha were forage types established in the nursery. DAs were supporting the distribution of these forage species to farmers. However, the biggest problem they are facing is the lack of a vehicle for transportation and supply of forage seedlings to farmers as per their demand. The workers described the status of the nursery site as follows:

“Following trainings provided to farmers by VOCA, the demand for forage species has been raised largely because the training has changed their attitude. To meet their demands, we are facing transportation problems and poor road access during rainy season. Unfortunately, we learned that VOCA is terminating and because of this we are not getting seeds and seedlings of other new forage species to plant in our nursery. We do not also have enough generators to pump water. There is also not enough budget to expand the nursery. Therefore, this nursery requires special attention either from the government or any other body. There should also be consecutive trainings for the farmers. We also need on-the-job training to enhance our skills.”

From the transcription, it has become obvious that the farmers’ demand for forage crops has been raised and it is increasing over time not only for project beneficiaries, but also for neighboring farmers. This is evidence for the substantial contribution of the project. The other issue that has come out clearly is that nursery sites require due attention and supports in the post-FEED III period. Unless the nurseries are structurally supported along with their own budget, project initiatives will not be sustained, and the high demand created among the farmers will not last long. This will in turn result in exacerbated feed problems and poor livestock productivity.

3.7. Technology Transfer by Model Farmers

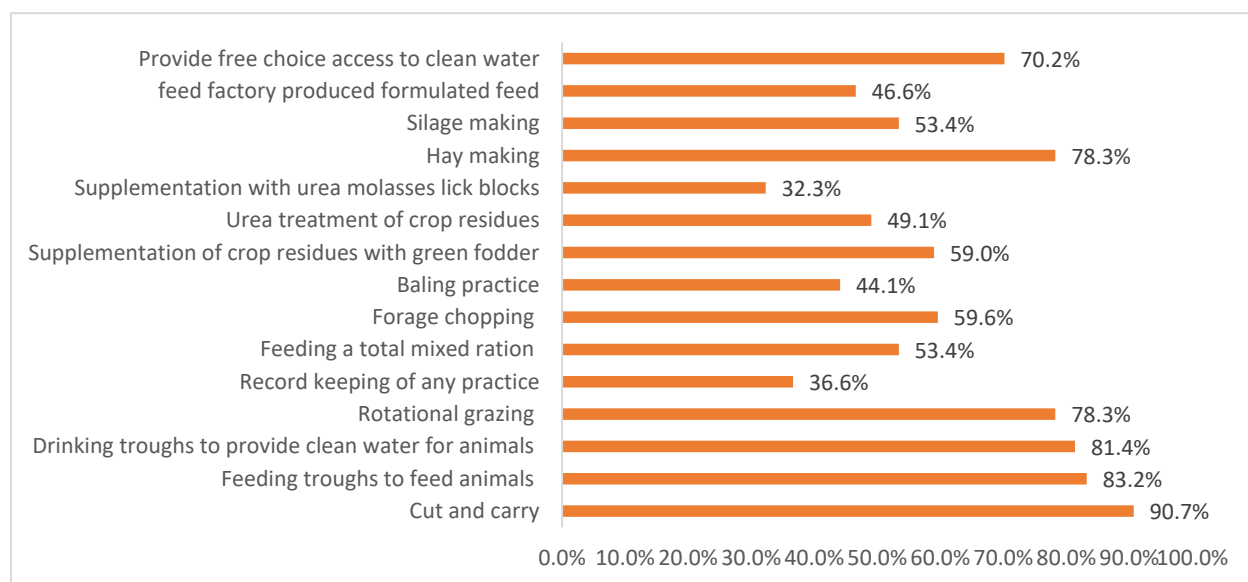
The final evaluation also asked model and follower farmers whether they have received any knowledge transfers from others. The data indicates that, on average, 79 percent of the farmers have received transfer of knowledge from others over the last four years. Specifically, 85 percent of them received transfer of knowledge on improved dairy animal nutrition and management, 82 percent on improved fattening management, 77 percent on improved poultry production, and 73 percent on improved forage production (Table 34). The data also indicate that about three-fourths of the follower farmers have received the knowledge transfer from model farmers, while 22 percent and 5 percent received the technology/practice from development agents and others. This indicates the importance of model farmers (farmer-to-farmer extension) in technology transfer (see Table 51 in Annex A for details). More than 50 percent of knowledge transfers were via one-on-one meetings with the model farmer, followed by visits to activities/practices of model farmers (more than 15 percent), and the remainder were learned through informal talks with the model farmer (Table 52 in Annex A).

Table 34. Percentage of follower farmers that received transfer of knowledge from model farmers over the past four years

Technology/practice		Amhara	Oromia	SNNP	Total
Received any transfer of knowledge on dairy animal nutrition and management	Yes	63.2%	94.1%	100.0%	85.1%
	No	36.8%	5.9%	0.0%	14.9%
Received any transfer of knowledge on improved fattening management	Yes	68.4%	90.2%	88.7%	82.0%
	No	31.6%	9.8%	11.3%	18.0%
Received any transfer of knowledge on improved poultry nutrition and feeding	Yes	54.4%	92.2%	86.8%	77.0%
	No	45.6%	7.8%	13.2%	23.0%
Received any transfer of knowledge on improved forage production	Yes	52.6%	68.6%	98.1%	72.7%
	No	47.4%	31.4%	1.9%	27.3%

The improved technologies practiced include cut and carry (91 percent), feeding troughs to feed animals (83.2 percent), use of drinking troughs to provide clean water (81.4 percent), use of rotational grazing (78.3 percent), use of hay making (78.3 percent), use of forage chopping (60 percent), use of supplementation of crop residues with green fodder (59 percent), use of silage making (53.4 percent), use of feeding a total mixed ration (53.4 percent), use of urea treatment of crop residues (49.1 percent), use of feed factory produced formulated feed (47 percent), use of baling (44.1 percent), use of record keeping (37 percent), and use of supplementation with urea molasses lick blocks (32.3 percent) in order of importance (Figure 10).

Figure 10. Percentage of follower farmers and their use of different improved practices



3.8. Project Evaluation Results Against the OECD-DAC Criteria

The project performance was assessed against the five OECD/DAC criteria, namely: relevance, efficiency, effectiveness, impact, and sustainability. The following section briefly discusses the findings of qualitative and quantitative extracts collected from community focus group discussions, case studies, key informant interviews, and secondary data of the FEED-III Project. Additional information has also been provided in Annex B.

3.8.1. Project Relevance

Based on the open-ended questions administered to the target beneficiaries, government officials, and experts operating in this sector of the Oromia, Amhara, and SNNP regions, the respondents have demonstrated a sheer agreement regarding the relevance of the project. They consider that the ACDI/VOCA project is a direct complementary project to what the government is undertaking and consistent with those of the government policy documents. They have also affirmed that the project objectives are in line with the interests and demands of the smallholder farmers, unions, and other stakeholders. The level of satisfaction regarding relevance of the project both to their needs and the policy documents have been reflected by the respondents. Thus, to say the least, the project was believed to be instrumental in raising awareness levels of the beneficiaries on livestock feed production and feeding. To this end, the respondents' satisfaction matrix also indicated that there is a high level of satisfaction regarding the project's relevance. Supplementary information on relevance has been provided in Annex B.

3.8.2. Project Efficiency

The project's efficiency was evaluated against the accomplishment of the project objectives within the limits of its allocated budget, time, and other relevant resources. It also considered the transparency and

integrity of the resource utilization process of the project. According to qualitative information, the project efficiency has shown positive results. KIIs in the Oromia region have underlined that the project was efficient in terms of resource allocation and use. They reported that budget disbursement was undertaken in a transparent manner. The budget was allocated to the respective offices in a transparent manner, and so was the resource utilization. Besides its transparent allocation and utilization of resources, the project was carried out at a relatively lower cost than other similar projects they have known.

The total budget of the FEED III project allocated to the four regional states was Ethiopian Birr (ETB) 156,509,524.28, including both the program and administrative budget. Equal amounts of the budget were allocated for each of the project regions. Out of the total budget, 98.3 percent was utilized until December 31, 2020 (Table 58 in Annex A). Assessment of budget utilization by activity reveals that the highest budget was allocated for activity 2 of the project, while the least was allocated for activity 1 (Table 59 in Annex A). Budget utilization status of activities in the project period until December 31, 2020, ranged from 49 to 95 percent. While the budget utilization status of activity 3 was the highest (95 percent), it was the least for activity 4 (49 percent) (Figure 18 in Annex A). Further explanation on project efficiency is included in Annex B.

3.8.3. Project Effectiveness

The OECD/DAC criterion of effectiveness was aimed at capturing the attainment of project objectives as per the original plan of the FEED III project. To this end, the FGD extracts from the Amhara region have shown that the project was effective in achieving its intents, as it was a timely response in addressing their pressing demands for feed. The training provided by the project changed their attitudes about animal feeding. It was widely reported that they were given adequate training on animal feeding, animal food preparation, concentrated feed, forage production, and strategies for how to maximize animal products.

Besides the basic training that focused on forage production, they were trained on dairy farming, fattening, and poultry production, which they attest has introduced them to new and specialized types of forages. The video-assisted approach to training had been attractive, adult-centered, and helpful to retain the imparted knowledge among the participants. It was also reported by beneficiary FGD members that the spillover effect of the project has now been evident among those who haven't been included in the training. Their neighbors have begun to adopt the new technology and undertake similar activities in planting forages and improving their traditional ways of animal husbandry, emulating what their neighbors were doing.

Plan versus achievement of project outputs and performance indicators

The FEED III project has planned about seven key results, as indicated in the project result framework, for which there are 14 performance indicators. In all the indicators, the level of achievement ranged from 0 to 255 percent (Table 60 in Annex A). Out of 14 performance indicators, the level of achievement for 12 of them was above 80 percent. Over achievement (above 100 percent) was recorded for six of the performance indicators. There were only two performance indicators for which the extent of performance lagged behind the plans, zero for one of them and 66 percent for the other.

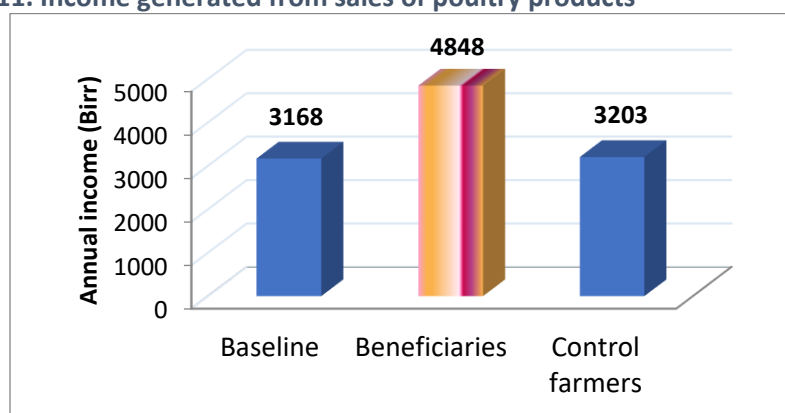
Among the project outcomes, the project has achieved two out of three indicators in outcome 1. For instance, the target of increasing poultry productivity by 15 percent was achieved far more than the plan (Table 61 in Annex A). Increasing the productivity of milk was also achieved far more than the 15 percent plan. However, the project did not progress as planned in increasing the productivity of fattened cattle. The plan was to increase the number of fattened animals by 15 percent in the project period. However, this was not achieved. According to qualitative information, the COVID-19 pandemic disrupted timely provision of trainings for beneficiaries. Other details of project effectiveness have been described in Annex B.

3.8.4. Project Outcomes and Impacts

Even though it is a bit early to measure the impact, the FEED-III project has been impactful in several ways. The following outcomes were observed in the project intervention areas:

- **Attitudinal changes of farmers on forage crops:** Before the FEED III project, no one was aware of forages used for animal feeding and the practice of allocating land for forage grown was little known. After the FEED III project, this attitude was changed and the farmers started demanding for more forage crop seeds and seedlings, which is one of the substantial impact of the project. Adopting forages was also observed to minimize feed problems.

Figure 11. Income generated from sales of poultry products



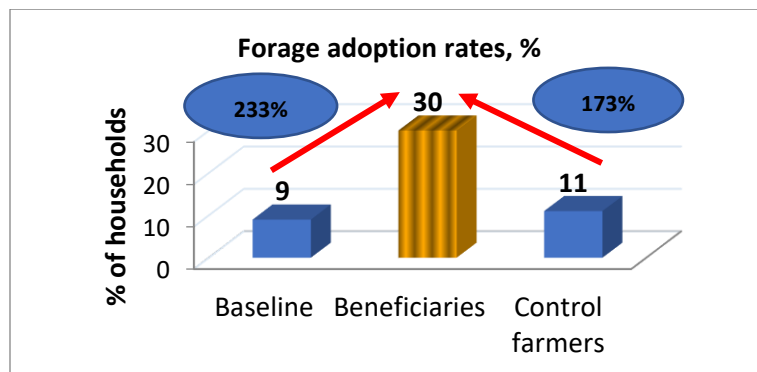
- **Household income growth:** The FEED III project has contributed to enhancing incomes, especially of beneficiary households. For instance, farmers during baseline generated Birr 3,168 from sales of poultry products (Figure 11). After project interventions, this income level was raised to Birr 4,848, which is a 53 percent rise. Even the incomes of beneficiaries grew by 51 percent over that of non-beneficiary farmers. This is one case and there could also be income growth from sales of forage seedlings.
- **Minimizing feed problems:** The main reason why FEED projects have been focusing on feeds is to minimize acute feed shortage problems. Compared to baseline situations, the FEED III project has had impacted in minimizing feed problems of beneficiaries by 50 percent.
- **Improved livelihoods of the beneficiaries:** Apart from income increment, the FEED III project has gone further and contributed to improvements in livelihoods of families, such as asset creation,

strengthened self-dependence, building new houses, saving money in bank, improved resilience, and others. Practical cases 1 to 3, below, demonstrate how the FEED III project helped households improve their livelihoods. Households have also obtained alternative income sources, which helped them improve their resilience to unexpected shocks. FGD participants in the Amhara region described how their livelihood changed as follows:

“Compared to the life situation we had before 4 or 5 years, currently our lifestyle has been improved. Though it depends on individuals’ performance, the training was life changing. Those who properly applied the concept of the training by the FEED-III project accumulated wealth. Even some people built houses in the nearest town. If we see our life before the project, we had nothing to save, but this time we have at least a bank account. This time we also have alternatives to escape unexpected natural or man-made hazards. Before the project, they were entirely dependent on seasonal crop production. This time, if we fail to secure our food consumption from crop production because of a natural disaster, we will escape the crisis by fattening animals.”

- **Increased adoption of forage technologies:** The adoption level of farmers has substantially improved for forage crops. Compared to baseline, adoption rate of beneficiary farmers was raised by more than three-folds (Figure 12). Compared to non-beneficiary farmers, adoption rate of beneficiaries was enhanced by more than two-folds. This is a substantial impact of the project because the practice of allocating farmlands for forage crops was limited practice among the farmers.

Figure 12. Adoption rates of forage crops



- **Image of ACIDI/VOCA built:** The substantial contributions FEED projects have had in the community and the unique approaches adopted during the FEED III project have built positive images of ACIDI/VOCA. The farmers wished ACIDI/VOCA would continue interventions and reinforce achievements. During KIIs with one of the beneficiary unions in the Amhara region, participants expressed the following about ACIDI/VOCA:

“To be frank, it would be very difficult to compare VOCA with other partners. VOCA is our eye. The supports of the project are ground touching, visible, and

measurable. So, if we are forced to compare it with others, we can say that there is no other partner who can even be comparable to VOCA. Since the supports we received from VOCA, we increased the amount of concentrate feed production, our awareness on the business of feed production was enhanced, and we were also linked to various customers for business relationships.”

Further information on project outcomes and impacts, and case analysis have been provided in Annex D4.

3.8.5. Project Sustainability

Sustainability of project initiatives depend on the commitment of the organization that overtook FEED III project initiatives. Even though the capacity of beneficiaries has been built, they still require technical support. The cooperatives and private enterprises engaged in feed processing and supply require closer technical and financial supports. Business orientation of cooperative unions is not yet very strong. Most of them are still constrained with financial shortages. Turnover of trained staff members is still a big concern among unions. The newly appointed personnel require immediate training supports to effectively run their duties. Strengthening unions and private processing enterprises ensures sustainable supply of feeds for beneficiaries. This, in turn, largely contributes to the sustainability of FEED III initiatives.

Forage nurseries, which are sources of planting materials for farmers, are also constrained by many factors, such as transportation, budgets, and inadequate skills of the staff. Unless these nurseries are strengthened by addressing their challenges, sustainability of farmers’ use of forage feeds will be at stake.

Pico projectors provided to each woreda/kebele to provide video-based trainings are also believed to contribute to the sustainability of the project’s achievements. This provides the Woreda Agriculture Offices and kebele-level DAs the ability to provide extended trainings for the farmers using these videos. Additional information on project sustainability has been provided in Annex C.

3.9. Best Practices and Lessons Learned From FEED III Project

During FGDs and KIIs with project beneficiaries, non-beneficiaries, and partner organizations, the following best practices and lessons were drawn:

- **Focus on enhancing capacity:** The FEED III project was different from earlier FEED projects in that it did not make a focus on input supplies and financial supports. Instead, it has been striving to raise the awareness, knowledge, and skills of beneficiary farmers on the importance of adopting improved feed technologies. In this approach, it was possible to raise demands of farmers, so they were able to purchase the required inputs on their own. This approach reinforced sustainability by making farmers act on their own.
- **Impressive training approaches:** There have been different approaches for providing trainings. Out of these, FEED III introduced the approach of video-aided training provision, which the farmers valued as highly useful and unforgettable. The farmers described it as, “seeing is believing,” and that what they

observed over video was best practices and experiences of model farmers, which motivates them to follow the same suit. This has also largely contributed to attitudinal changes of the farmers on planting improved forages on farmlands.

- **The practice of linking follower farmers⁷ with beneficiaries:** This was recognized to be one of the best extensions approaches to disseminate technologies and improved knowledge. Beneficiary farmers have been sharing their knowledge and skills, seeds, and seedlings with their neighbors and follower farmers. Because of this, the impact of the project has spilled over to followers and neighboring farmers.
- **The practice of empowering input manufacturing units and dealers:** The FEED III project has been focusing not only on the farmers but also enterprises engaged in the manufacturing of feeds and other inputs across poultry, feed, and livestock value chains. These enterprises have been receiving trainings and were supported in establishing linkages with their business customers.
- **Organizing trade fairs and B2B events:** Following the empowerment of farmers and enterprises through training and experience sharing visits, one of the best practices of the FEED III project was creating opportunities for business linkages among producers and consumers. B2B events and trade fairs were observed to be best practices for establishing business linkages.

4. Conclusions

Both the household survey and the qualitative data gathered from KIIs and FGDs in the Amhara, SNNP, and Oromia regions have provided positive results regarding the project's performance, including against the five OECD-DAC criteria. Thus, the project was found to be relevant in addressing the felt needs of treatment and done in consistent manner with the policy prescriptions of the government. It was an effective undertaking which has been able to build local capacity in transforming the traditional practices of animal feed management. It has also been effective in changing the attitudes, knowledge, and skills of individual farmers, institutions, and actors in the entire value chain of animal feed production and marketing. The project was found to be efficient regarding its timeliness and cost effectiveness.

Regarding the impact of the project, even though the true extent of the impact is not yet fully known, the project has yielded significant outcomes and become impactful in changing the traditional way of thinking and practice in livestock production. It enhanced the production of milk processing, income, and asset holding of the beneficiary farmers, while resulting in increased marketing of dairy products.

However, there are still serious challenges in widening the project's benefits. Additionally, there are institutional capacity limitations in providing support services for poultry production, specifically in terms of the health services. Regarding the sustainability of the project benefits, the study has shown positive results. Local officials, experts, and communities were aware of their respective roles for maintaining the program's benefits in the absence of donor agencies due to the capacity building works of FEED III during

⁷ Follower farmers are those neighbors of beneficiary farmers who benefit from spillover effects of project interventions. Beneficiary farmers share the knowledge and skills obtained from the project to follower farmers.

its intervention period. In general, despite the challenges that require further work, the project was found to be successful in achieving its initial objectives.

It was also evident that households' participation in animal fattening has positively contributed to increasing income, skills of fattening, and livelihood diversification, as well as a spillover effect for fattening. Additionally, the change in community perception among farmers is a major influence. Very few households were aware of forage and animal feed prior to the FEED III training. After the training, not only trained people, but also their neighbors and the community are developing innovations around forage and livestock production.

The FEED III project has also contributed to improvements in the dairy sector. Being sensitized with project supports in addressing feed problems and enhancing the knowledge and skills of dairy management has increased the number of farmers engaged in dairy production during the project. Apart from this, productivity of dairy cows, such as milk yields and lactation length, have demonstrated increasing trends over the project period. The practice of selling dairy products, which was limited before the project, has also improved after enhancing business orientation of the beneficiary farmers.

Another indicator of project contribution and attribution was the rise of beneficiary incomes from sales of dairy products during project periods compared to baseline and non-beneficiary farmers. The FEED III project has also witnessed empowering women and raising their participation in dairy activities and decision-making. The project has also tremendously contributed to reducing dairy production problems. The proportion of farmers who reported dairy production problems has reduced towards the end of the project, which is additional evidence for the positive contributions of the FEED III project.

The number of improved poultry owners has increased during the FEED III project period. The use of improved poultry feed and housing types has also enhanced business orientation of project beneficiary farmers. The FEED III project has largely contributed to supplementing on-farm incomes of households from sales of poultry products. The enhanced knowledge and skills of poultry farmers gained from the FEED III project trainings has helped improve feed and disease management practices. Poultry feed availability has also been improved because of FEED III project interventions.

Poultry production has also revealed a gender dimension, where the involvement of women and youth was substantial. The prevailing information exchange mechanism among women during social gatherings and events has contributed to transfer of technologies and knowledge from beneficiary to non-beneficiary women, amplifying the spillover effect.

Since engagement of the FEED III project, the proportion of forage growers was enhanced, which contributed to reducing farmers' feed problems by nearly half. Apart from this, the FEED III project has helped in increasing the number of forage grower farmers, which largely contributed to minimizing feed shortage problems.

In general, the FEED III project has made tremendous contributions to the growth of the livestock sector. Out of the 14 performance indicators of the major outputs, the level of achievement for 12 of them was above 80 percent. Over achievement (beyond 100 percent) was also recorded for six of the performance indicators. However, the positive contributions of the project must be sustained to realize its full benefits.

The COVID-19 pandemic was the major reason why some of the activities suffered underachievement compared to the initial plans.

Additionally, the initiatives made by the FEED III project should be taken over by development partners engaged in the agriculture sector, such as the Office of Agriculture, Agricultural Research Institutes, Higher Learning Institutes, and the NGOs. This will be good for the sustainability of the project's benefits.

5. Recommendations

- Considering the project success, it would be imperative to advance the market information system, feed channels, and revenue diversification. This will help to resolve feed problems to sustain the good practices of FEED III. It should fit the context of the study area. Offices of Agriculture and NGOs, such as SNV and other development partners, have roles to play in scaling up the successful FEED III project initiatives.
- One of the positive impacts of the FEED III project is the knowledge transfer program of the model farmers to the follower farmers in the project intervention areas. Therefore, Woreda Agriculture Development Office, SNV, and other development partners engaged in the agriculture sector should encourage that knowledge and experience sharing activities model and follower farmers across study areas. This can be accomplished through creation of community experience sharing channels where farmers can share their experiences with other farmers in their localities. This will continue to trickle down and improve spillover effects of the FEED III project.
- It was also evident that households' participation in animal fattening has positively contributed to increased income, improved skills of fattening, and livelihood diversification, as well as spillover effects of fattening. Additionally, the change in community perception among farmers was a major influence. On this account, it would be imperative to advance the market information system and feed distribution channels, as well as to provide periodic awareness training on the benefits of animal fattening as a livelihood strategy. The Woreda Agriculture and Livestock Office should work in partnership with locally deployed NGOs, institutes of higher education, unions and cooperatives, and others on strengthening and renovating animal fattening practices as part of livelihood diversification strategies, fitting to different agroecological settings.
- The positive outcomes and best practices of the FEED III project regarding animal fattening, and other livelihood diversification schemes, including poultry, forage, dairy, and poultry productions, need to be scaled up and handed over to the government. They should disseminate study findings and facilitate a forum for knowledge sharing between enterprises and feed producers. This can be facilitated by institutes of higher education working in the sector, locally deployed NGOs, the Woreda Administration, feed enterprises, private feed manufacturers, and respective regional offices. To materialize this, it would be important to capitalize on the best practices and innovations of the local communities on various livelihood diversification strategies and the previous experiences of FEED projects. Thus, for the effective implementation of such an innovative idea, it is crucial to create

strong partnership, coordination, and synergy with the government system at different levels of administration and with locally deployed NGOs to avoid duplication of efforts.

- One of the mechanisms to make the project achievements sustainable would be strengthening inter and intra institutional collaboration with defined roles and responsibilities. Government bodies, such as Offices of Agriculture, Higher Learning Institutes, and development partners, including NGOs devoted to improving the agriculture sector, need to take over project initiatives. They should include them in their regular annual plans as per their mandates to ensure sustainability. This should be facilitated by the ministry of agriculture and the livestock development sector.
- Agricultural extension workers in respective woredas should keep strengthening and helping the farmers who have been beneficiaries of the FEED III project. The Woreda Office of Agriculture's livestock department should keep providing technical support for the farmers.
- Feed processor enterprises need to be supported both technically and financially to help them supply feed inputs on a sustainable basis. The woreda cooperative promotion office should oversee this as part of their routine technical support to co-ops. NGOs working in the agriculture sector, such as SNV, should also take initiative to support these enterprises to ensure sustainable supply of feeds to the farmers engaged in dairy and poultry production, fattening, and others.
- Provide supports for feed ingredient importers. Feed ingredient importers are facing acute hard currency shortages. As a result, feed processors faced problems producing quality feed products. The prices of concentrate feeds also sky-rocketed, the consequence of which might seriously affect productivity of the dairy, fattening, and poultry sectors. The government should consider this issue as serious and give priority to accessing hard currency for feed ingredient importers.
- Enhance the technical and financial capacities of feed processor cooperatives. Co-ops are still in need of technical supports on improved management and accounting practices. Trainings and experience sharing are required for co-ops to strengthen their ability of properly managing their enterprises. Offices of Agriculture, the Cooperative Promotion Agency, NGOs, and other development partners engaged in the agriculture sector can be supportive of this initiative.
- Enabling credit services is also required for enterprises engaged in feed processing, dairy, fattening, and poultry production. These enterprises often start their businesses with limited capital, which is not adequate to render the required services and satisfy input needs of the farmers and other clients. Public and private financial institutes should consider designing enabling credit services for these enterprises to enable them to exploit their potential to supply quality products for their clients. NGOs can also design revolving fund schemes for smallholder farmers to help them start business-oriented enterprises and improve their livelihoods.
- Some of the development interventions, such as improved poultry and dairy, need to focus on women and youth. Enhancing the capacity of selected women means building the capacity of other women in the community because information exchange among them is fast. Non-target women will also benefit from interventions through spillover effects.

- Strengthen and scale-up video-based extension services to the farmers engaged not only in the livestock sector but also beyond. Farmers highly preferred video-based extension services, for they provide opportunities for learning from best practices and success stories of other model or progressive farmers. Video transmission should focus on success stories of the farmers in their locality or other places and should be narrated in local languages. Offices of Agriculture should take leadership of this initiative and mobilize other development partners, such as NGOs and international development organizations.
- Support and strengthen day-old chick hatching enterprises. As farmers' awareness is raising on the importance of smallholder poultry production, their demand will also raise for chicks and pullets. Poultry enterprises and farmers require sustainable supply enterprises of chicks and pullets. Therefore, these enterprises need financial and technical supports through trainings and experience sharing. Youth can also be organized for establishment of new chicks and pullet production enterprises. Offices of Agriculture should take a lead on this, supported by NGOs and other development partners.
- The respective woredas' agriculture offices should strengthen forage nursery sites technically and logistically to help them supply forage seedlings and cuttings to the farmers at large on a sustainable basis. Nursery sites require stable administrative structures where adequate and skilled staff has been allocated. These staff require on-the-job trainings and experience sharing to develop their knowledge and skills further on improved nursery management practices. Apart from this, nursery sites required supports in transportation services, such as field vehicles, to sustainably supply forage seedlings to the farmers not only in their locality but also beyond. It would also be feasible and ensure sustainability if nursery sites are managed by youth as income-generating enterprises. Since good awareness has been created among the farmers on the uses of forage crops, it is also advisable to establish new nursery sites across different parts of the country. This should be preceded by awareness creation and experience sharing. Offices of Agriculture and NGOs engaged in the agriculture sector can play crucial roles in strengthening and sustaining existing nurseries and establishing new ones.

Annexes

Bibliography

FAO. 2019. The future of livestock in Ethiopia. Opportunities and challenges in the face of uncertainty. Rome. 48 pp. Licence: CC BY-NC-SA 3.0 IGO.

Central Statistical Agency (CSA). (2014). Federal Democratic Republic of Ethiopia (FDRE). Population projection of Ethiopia for all regions: At Woreda level from 2014 – 2017. Addis Ababa, Ethiopia.

McPeak, J. G., Little, P. D., & Doss, C. R. (2011). Risk and social change in an African rural economy: livelihoods in pastoralist communities (Vol. 7). Routledge.

CSA. (2007). Summary and statistical report of population and housing census: Population size by age and sex. Addis Ababa, Ethiopia.

Saha, B., and Bahal, R. (2014). Livelihood diversification pattern among the farmers of West Bengal. *Economic Affairs* 59(3). doi 10.5958/0976-4666.2014.00001.1

Currently, 1 USD = 40.3082 ETB ([Convert US Dollars to Ethiopian Birr - Exchange Rates \(exchange-rates.org\)](https://www.exchangerates.org/)) (Feb 24, 2021).

Gudina Goda Korsu, Destaw Akele, K. Rajan, The Effect of Devaluation on Domestic Prices in Ethiopia, *American Journal of Economics*, Vol. 8 No. 4, 2018, pp. 191-201. doi: 10.5923/j.economics.20180804.02

Central Statistical Agency. (2018): Government of Ethiopia, General year-on-year inflation increases, <http://www.ena.gov.et/en/index.php/economy/item/4263>

Annex A: Detailed Tables and Figures

Table 35. Percentage of households reporting participation in crop production

Dataset	Comparison groups	Region			
		Amhara	Oromia	SNNP	All
Baseline		96.8	99.0	97.6	97.8
End line	Beneficiary	96.7	98.6	88.5	94.6
	Non-Beneficiary	92.3	96.7	76.9	88.6

Table 36. Percentage of households reporting participation in dairy production

Dataset	Comparison groups	Region			
		Amhara	Oromia	SNNP	All
Baseline		52.2	53.3	61.4	55.6
End line	Beneficiary	46.0	45.7	50.0	47.2
	Non-Beneficiary	30.8	40.7	25.8	32.4
Chi-Square ^a					0.617 (.432)
Chi-Square ^b					20.777 (.000)

^a Chi-Square between beneficiary and non-beneficiary group at the end line evaluation.

^b Chi-Square between baseline and end line data.

Table 37. Percentage of households reporting participation in animal fattening

Dataset	Comparison groups	Region			Overall
		Amhara	Oromia	SNNP	
Baseline		34.2	29.0	30.6	31.3
End line	Beneficiary	52.1	23.5	21.2	32.2
	Non-Beneficiary	39.6	20.3	10.4	23.4
Chi-Square ^a					13.093 (.000)
Chi-Square ^b					1.981 (.159)

^a Chi-Square between beneficiary and non-beneficiary group at the end line evaluation.

^b Chi-Square between baseline and end line data.

Table 38. Percentage of households reporting participation in poultry production

Dataset	Comparison groups	Region			Overall
		Amhara	Oromia	SNNP	
Baseline		61.4	44.0	47.1	50.9
End line	Beneficiary	60.7	44.9	20.6	42.0
	Non-Beneficiary	49.5	26.9	9.9	28.8
Chi-Square ^a					2.309 (.129)
Chi-Square ^b					52.334 (.000)

^a Chi-Square between beneficiary and non-beneficiary group at the end line evaluation.

^b Chi-Square between baseline and end line data.

Table 39. Average livestock ownership by breed (baseline and end line surveys)

Livestock type	Time	Breed	Region			
			Amhara	Oromia	SNNP	All
Bull	Baseline	Indigenous	2.6	2.6	2	2.46
	End line		2.82	2.09	1.14	2.01

Livestock type	Time	Breed	Region			
			Amhara	Oromia	SNNP	All
Cow	Baseline	Crossbreed	0.26	0.4	0.1	0.23
	End line		0.36	0.26	0.22	0.28
	Baseline	Indigenous	2.6	2.3	1.8	2.13
	End line		2.09	1.65	1.64	1.79
Sheep & Goats	Baseline	Crossbreed	0.3	0.6	0.5	0.40
	End line		0.49	0.49	0.69	0.56
	Baseline	Indigenous	3.7	5.2	2.4	4.74
	End line		2.75	1.27	1.90	1.69
	Baseline	Crossbreed	0.01	0.2	0.09	0.08
	End line		0.01	0.00	0.16	0.06

Table 40. Percentage of households reporting purchase of animals for fattening

Dataset	Comparison groups	Region			
		Amhara	Oromia	SNNP	All
Baseline		63.4	56.8	52.9	58.0
End line	Beneficiary	53.4	43.0	82.3	56.5
	Non-Beneficiary	57.4	42.4	87.5	57.3
Chi-Square ^a					.012 (.912)
Chi-Square ^b					.001 (.982)

^a Chi-square test between beneficiary and non-beneficiary group at the end line evaluation.

^b Chi-square test between baseline and end line data.

Table 41. Percentage of households reporting receiving training on animal fattening

Dataset	Respondent group	Region			
		Amhara	Oromia	SNNP	All Regions
Baseline		24.6	9.6	38.8	24.2
End line	Beneficiary	90.3	97.5	98.4	93.7
	Non-beneficiary	16.4	9.1	18.8	14.5
Chi-Square ^a					424.815 (.000)
Chi-Square ^b					222.078 (.000)

^a Chi-square test between beneficiary and non-beneficiary group at the end line evaluation.

^b Chi-square test between baseline and end line data.

Table 42. Percentage of households reporting the purchase of concentrate feed for fattening animals

Dataset	Respondent group	Region			
		Amhara	Oromia	SNNP	All Regions
Baseline		29.6	43.5	50.4	40.6
End line	Beneficiary	25.0	27.8	64.5	33.4
	Non-beneficiary	36.1	18.2	43.8	31.8
Chi-Square ^a					2.027 (.155)
Chi-Square ^b					4.415 (.036)

^a Chi-square test between beneficiary and non-beneficiary group at the end line evaluation.

^b Chi-square test between baseline and end line data.

Table 43. Percentage of households reporting the adequacy of feed distribution channels

Dataset	Respondent group	Regions			
		Amhara	Oromia	SNNP	All regions
Baseline		28.6	18.5	0.0	14.0
End line	Beneficiary	43.2	59.1	27.5	40.6
	Non-beneficiary	31.8	16.7	14.3	25.7
Chi-Square ^a				19.403 (.000)	
Chi-Square ^b				17.763 (.000)	

^a Chi-square test between beneficiary and non-beneficiary group at the end line evaluation.

^b Chi-square test between baseline and end line data.

Table 44. Percentage of farmers reporting feed problems for fattening animals (multiple response items)

Dataset	Respondent group	Problems	Region			
			Amhara	Oromia	SNNP	All regions
Baseline		High price	33.3	65.9	35.6	44.6
		Low quality	3.3	7.3	1.7	3.8
		Limited supply	63.3	24.4	62.7	50.8
		Other	0.0	2.4	0.0	0.8
End line	Beneficiary	High price	55.6	100.0	63.6	61.9
		Low quality	14.8	0.0	15.2	14.3
		Limited supply	29.6	0.0	21.2	23.8
	Non-beneficiary	High price	82.4	100.0	50.0	76.9
		Low quality	11.8	0.0	0.0	7.7
		Limited supply	5.9	0.0	50.0	15.4

Table 45. Percentage of households reporting coping strategies used for feed problems for fattening animals (multiple response items)

Dataset	Respondent group	Strategies	Region			Overall
			Amhara	Oromia	SNNP	All regions
Baseline		Reduce the quantity of feed given to chicken	13.3	19.5	5.1	11.5
		Shift to own production	50.0	36.6	18.6	31.5
		Use some other feed materials	36.7	43.9	76.3	56.9
End line	Beneficiary	Reduce the quantity of feed given to fattening animals	10.7	0.0	6.1	7.7
		Shift to own production	78.6	75.0	57.6	67.7
		Use some other feed materials	7.1	25.0	36.4	23.1
		Don't know	3.6	0.0	0.0	1.5
	Non-beneficiary	Reduce the quantity of feed given to chicken	11.8	33.3	0.0	11.5
		Shift to own production	82.4	33.3	66.7	73.1
		Use some other feed materials	5.9	33.3	33.3	15.4

* Since these are multiple response items, the percentages do not add up to 100 percent.

Table 46. Percentage of households reporting on the affordability of concentrate feed for fattening animals (multiple response times)

Dataset	Respondent group	Region			
		Amhara	Oromia	SNNP	All Regions
Baseline		9.5	25.9	0.0	11.5
End line	Beneficiary	11.4	45.5	25.0	23.6
	Non-beneficiary	9.1	50.0	0.0	14.3
Chi-Square ^a					4.668 (.031)
Chi-Square ^b					3.071 (.080)

^a Chi-square test between beneficiary and non-beneficiary group at the end line evaluation.

^b Chi-square test between baseline and end line data.

Table 47. Percentage of households reporting price fluctuation of concentrate feed for fattening animals

Dataset	Respondent group	Region			
		Amhara	Oromia	SNNP	All Regions
Baseline		83.3	88.9	95.1	89.8
End line	Beneficiary	88.6	90.9	42.5	71.7
	Non-beneficiary	77.3	83.3	42.9	71.4
Chi-Square ^a					6.882 (.009)
Chi-Square ^b					11.173 (.001)

^a Chi-square test between beneficiary and non-beneficiary group at the end line evaluation.

^b Chi-square test between baseline and end line data.

Table 48. Percentage of households reporting checking the quality of feed purchased for fattening animals

Dataset	Respondent group	Region			Overall
		Amhara	Oromia	SNNP	
Baseline		54.8	46.3	86.9	64.3
End line	Beneficiary	50.0	81.8	62.5	61.3
	Non-beneficiary	63.6	83.3	28.6	60.0
Chi-Square ^a					.000 (.989)
Chi-Square ^b					.008 (.928)

^a Chi-square test between beneficiary and non-beneficiary group at the end line evaluation.

^b Chi-square test between baseline and end line data.

Table 49. Percentage of households reporting quality checking methods (multiple response items)

Dataset	Respondent group	Quality checking methods	Region			
			Amhara	Oromia	SNNP	All regions
Baseline		Through physical detection using indigenous knowledge	100.0	88.0	100.0	97.0
		Through physical detection by livestock expert	0.0	8.0	0.0	2.0
		Other (specify)	0.0	4.0	0.0	1.0
End line	Beneficiary	Through physical detection using indigenous knowledge	72.7	88.9	96.0	86.2

		Through physical detection by livestock expert	27.3	11.1	4.0	13.8
		Other (specify)	0.0	0.0	0.0	0.0
	Non-beneficiary	Through physical detection using indigenous knowledge	92.9	100.0	100.0	95.2
		Through physical detection by livestock expert	7.1	0.0	0.0	4.8

Table 50. Gender role in dairy production activities

Activities	Responsible person	Baseline (2018)	End line (2020)	
			Beneficiary	Non-beneficiary
Cleaning cows	Adult male	41	42	43
	Adult female	56	93	89
	Children under 18	2	27	26
Feeding the cows	Adult male	76	77	71
	Adult female	23	85	86
	Children under 18	1.3	29	30
Forage collection	Adult male	74	86	80
	Adult female	12	68	57
	Children under 18	1.7	28	29
Concentrate feed purchasing	Adult male	41	89	76
	Adult female	6	52	60
	Children under 18	0.7	11	10
Factory ingredients purchasing	Adult male	41	89	78
	Adult female	6	45	53
	Children under 18	0	10	9
Milking	Adult male	36	37	33
	Adult female	62	88	86
	Children under 18	0	14	5
Milk processing (butter, cheese)	Adult male	9	10	8
	Adult female	87	97	100
	Children under 18	0.5	16	10
Selling cows and calves	Adult male	78	84	82
	Adult female	14	40	43
	Children under 18	0	9	8
Selling dairy products	Adult male	24	32	34
	Adult female	50	88	85
	Children under 18	0	17	10
Calf feeding and management	Adult male	64	64	68
	Adult female	33	91	90
	Children under 18	2	34	42

Activities	Responsible person	Baseline (2018)	End line (2020)	
			Beneficiary	Non-beneficiary
Watering	Adult male	63	64	59
	Adult female	35	88	88
	Children under 18	2	42	44
Cow cleaning	Adult male	76	59	54
	Adult female	32	86	78
	Children under 18	2	3	352
Udder washing	Adult male	29	42	27
	Adult female	45	83	90
	Children under 18	0	21	14

Table 51. Who transferred the knowledge to the follower farmers?

Technology/practice	Technology source	Region			
		Amhara	Oromia	SNNP	Total
Who transferred the knowledge on dairy animal nutrition and management to you?	Model farmer	94.4%	47.9%	88.7%	75.9%
	Development agent	5.6%	43.8%	9.4%	20.4%
	Others	0.0%	8.3%	1.9%	3.6%
Who transferred the knowledge on improved fattening management to you?	Model farmer	94.9%	45.7%	85.1%	74.2%
	Development agent	5.1%	47.8%	10.6%	22.0%
	Others	0.0%	6.5%	4.3%	3.8%
Who transferred the knowledge on improved poultry nutrition and feeding to you?	Model farmer	93.5%	44.7%	84.8%	71.8%
	Development agent	6.5%	51.1%	10.9%	25.0%
	Others	0.0%	4.3%	4.3%	3.2%
Who transferred the knowledge on improved forage production to you?	Model farmer	96.7%	37.1%	88.5%	75.2%
	Development agent	3.3%	54.3%	5.8%	19.7%
	Others	0.0%	8.6%	5.8%	5.1%

Table 52. How did you receive the knowledge transfer?

	Knowledge transfer method	Amhara	Oromia	SNNP	Total
How did you receive the knowledge transfer on dairy animal nutrition and management?	One-on-one meetings with model farmer	47.2%	45.8%	86.8%	62.0%
	Visiting model farmer activities/ practices	27.8%	31.3%	7.5%	21.2%
	Informal talks with the model farmer	25.0%	22.9%	5.7%	16.8%
How did you receive the knowledge transfer on improved fattening management?	One-on-one meetings with model farmer	52.5%	45.7%	87.2%	62.4%
	Visiting model farmer activities/ practices	37.5%	28.3%	10.6%	24.8%
	Informal talks with the model farmer	10.0%	26.1%	2.1%	12.8%
How did you receive the knowledge	One-on-one meetings with model farmer	58.1%	48.9%	84.8%	64.5%
	Visiting model farmer activities/ practices	29.0%	27.7%	15.2%	23.4%

transfer on improved poultry nutrition and feeding?	Informal talks with the model farmer	12.9%	23.4%	0.0%	12.1%
How did you receive the knowledge transfer on improved forage production?	One-on-one meetings with model farmer	50.0%	42.9%	84.6%	63.2%
	Visiting model farmer activities/ practices	40.0%	34.3%	11.5%	25.6%
	Informal talks with the model farmer	10.0%	22.9%	3.8%	11.1%

Figure 13. Top five challenges in poultry production during baseline

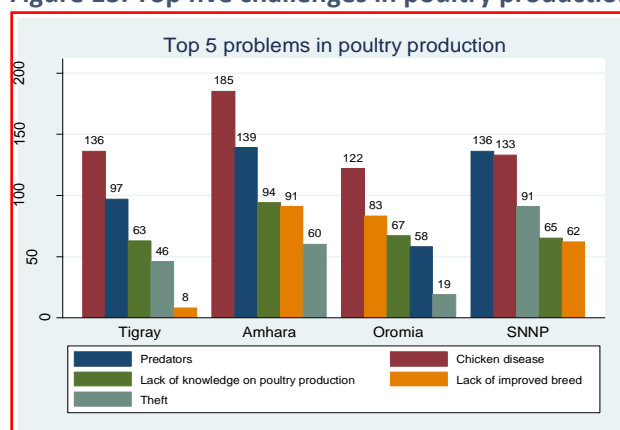


Figure 14. Top five challenges in poultry production during end line

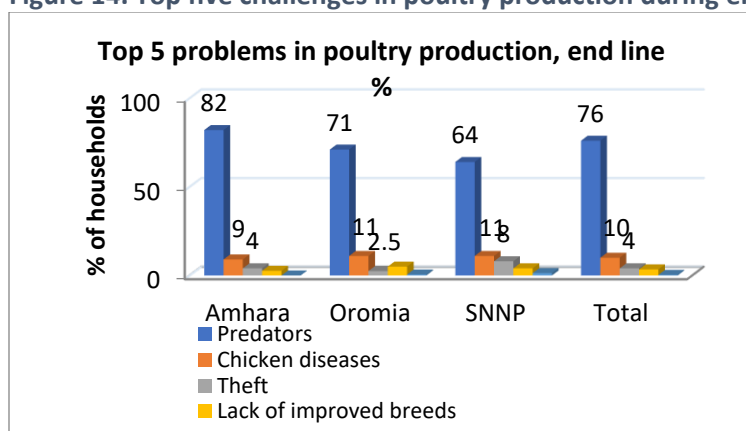


Table 53. Quantity of poultry feed used and total cost of feed during baseline study, 2018

Feed type	Amhara		Oromia		SNNP		Source of feed (% of respondents)				
	Qty (KG)	Cost (Birr)	Qty (KG)	Cost (Birr)	Qty (KG)	Cost (Birr)	Co-op	Own production	Private Enterprise	Other farmers	NGO
Layers feed	88	611	56	552	43	299	24	48	10	18	0
Broilers feed	150	750	46	292	99	697	0	0	75	25	0
Grain	12	73	50	175	260	346	13	0	13	47	27

Table 54. Quantity of poultry feed used and total cost of feed during end line study, 2020

Feed type	Amhara		Oromia		SNNP		Source of feed (% of respondents)				
	Qty (KG)	Cost (Birr)	Qty (KG)	Cost (Birr)	Qty (KG)	Cost (Birr)	Co-op	Own production	Private Enterprise	Other farmers	NGO
Layers feed	22.3	542.5	486.3	6,602.1	59.1	917.4	23	-	9	5	-
Broilers feed	0	0	525	925	32.4	312.1	45	-	-	9	-
Grain	157.5	1,575	50	650	46.8	645	11	17	-	17	-

Table 55. Percentage of training recipient households and adopters of planting material in past 12 months

Variable	Amhara		Oromia		SNNP		Total	
	BL*	EL	BL	EL	BL	EL	BL	EL
Training on improved forage	23	89	29	92	40	98	36	94
Use of improved forage planting material	5	64	3	19	10	44	3	50
Source of planting material (% of households)								
Government	50	49	0	100	91	73	86	62
NGO	12	44	0	0	7	12	8	27
Private	37	1.3	0	0	0	5	5	3.1
Farmer-to-farmer	0	6	0	0	2	10	1.5	8

*BL=Baseline EL=end line

Table 56. Major forage production problems by region and number of respondents, 2018

Problems	Amhara		Oromia		SNNP	
	Baseline	End line	Baseline	End line	Baseline	End line
Lack of improved forage seed	7	46	4	19	59	39
Lack of water for irrigation	26	2.5	1	4	56	3
Shortage of land	29	47	4	73	92	51
Lack of knowledge on forage production	7	0	4	0	42	0

Table 57. Forage varieties grown and used by survey households (%) during baseline and end line

Forage crop	Amhara		Oromia		SNNP		Total	
	Baseline	End line	Baseline	End line	Baseline	End line	Baseline	End line
Elephant Grass	9.7	48	14.3	19	50.0	96	39	62
Sesbania	16.1	27.1	14.3	6.3	0	0	5	15.4
Rhodes	3.2	11.8	0	0	1.9	1.8	2.1	7.1
Vetch	9.7	2.4	0	0	0.9	0	2.8	1.3
Sinar	16.1	1.2	14.3	50.0	5.7	0	8.3	5.8
Desho	0	4.7	0	18.8	65.1	1.8	47.6	5.1
Buffle grass	3.2	0	14.3	6.3	0.9	0	2.1	0.6
Others	61.3	3.5	71.4	0	17.0	0	29.0	1.9

Figure 15. Household experiences of purchasing forage inputs in the last 12 months, 2020

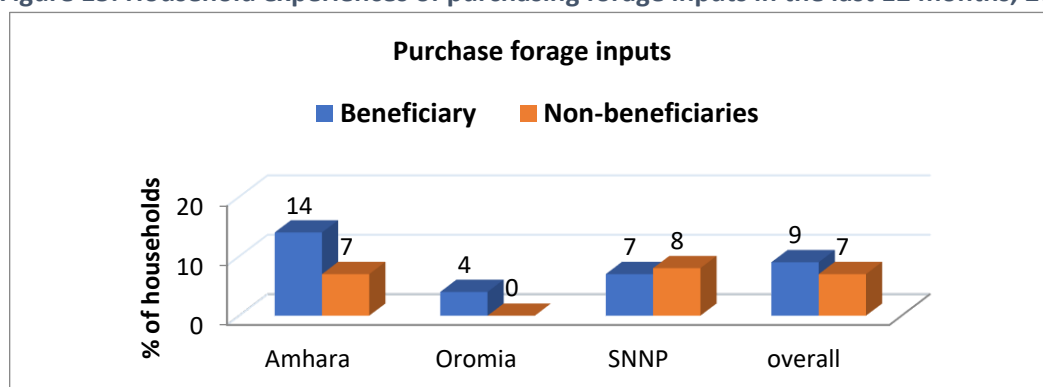


Figure 16. Sources of forage inputs for beneficiary farmers, 2020

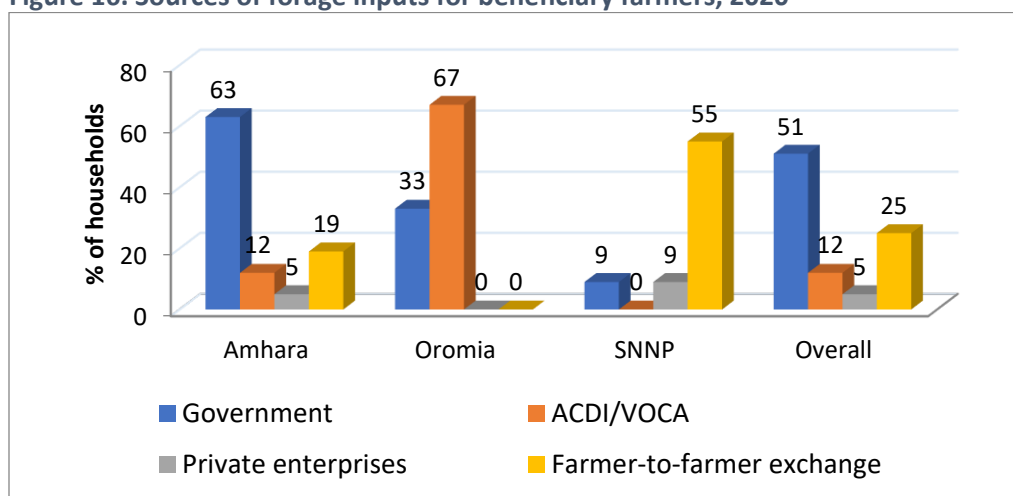
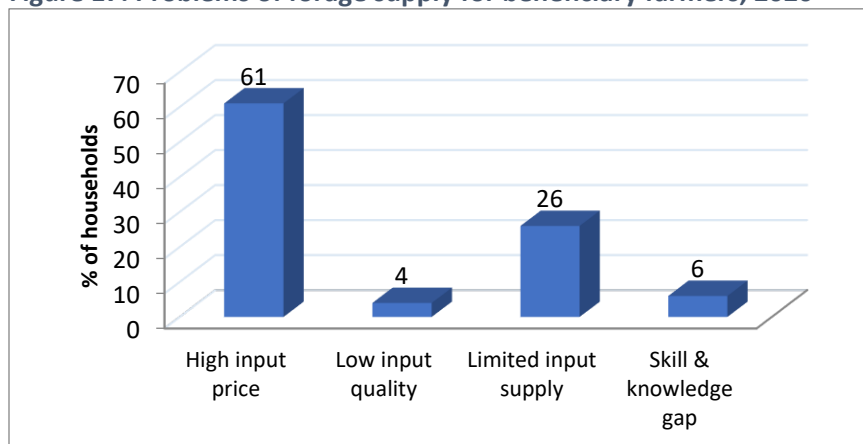


Figure 17. Problems of forage supply for beneficiary farmers, 2020



Annex B: Project Evaluation Against the OECD-DAC Criteria

Project Relevance

Relevance was one of the criteria used to assess:

- Appropriateness of project objectives and implementation strategies to the felt needs of the project targets
- Consistence to and complementarity with existing policies and strategies in relation to livestock feed production
- Appropriate targeting of beneficiaries in terms of geographic locations and households, including gender considerations in the selection process

Similar FGD and KII extracts from the Amhara region have indicated that the project was an appropriate remedial response to the problems they have long been facing in terms of animal husbandry. Even though they have cattle and shoats in numbers, the level of productivity was deteriorating from time to time, mainly due to lack of improved feed in quality and quantity. This was exacerbated by lack of knowledge and skills on feed production and feeding mechanisms. Thus, it was reported that the relevance of the project in addressing the right problem in a timely manner was undisputed in all the study sites of the Oromia, SNNP, and Amhara regions.

In terms of beneficiary targeting, the qualitative responses from both regions have indicated that the choice of kebeles and beneficiary households were clearly done as per project targeting criteria. The choice of kebeles was based on livestock production potential considering land availability, agro-ecological diversity, and the results of a needs assessment. Most of the beneficiary households were those who demonstrated enthusiasm, interest, and readiness to take part in the project. During the training sessions, the same interest was witnessed from the participant farmers who were energetic and determined to put the acquired skills into practice. The selection was criteria-based and upon agreement reached between the farmers and the Livestock and Fishery Development Offices.

A senior official key informant from the Bureau of Fishery and Livestock in the Oromia region shared the same views with woreda officials, confirming the project objectives were in line with government development priorities and beneficiary interests. According to the senior official, the livestock subsector provides an important opportunity for the country's development. As clearly stated in the project planning document, the intervention of the FEED III project is in line with government policy, strategy, and guidelines. The respondent further emphasized that nothing conflicted with the government strategic document, and it rather complements what the policy document laments to achieve.

The respondent further reinforced the views of the woreda officials that the beneficiary targeting was carried out in a participatory and transparent manner whereby all relevant actors took an active role. It was done in the presence and active participation of the relevant government structure. Most of the beneficiaries were selected based on their agro-ecological conditions, readiness to adopt new technologies, and size of land and animals they have. Reports have also attested that there was gender consideration in the targeting process, which means many women were given an opportunity to participate in the project training.

Similarly, FGD reports from the Amhara region confirmed the relevance of the project in terms of its gender inclusiveness. As the project targeted a minimum of 30 percent of the participants to be women households who took part in the training, its relevance in terms of gender inclusiveness was reported as unquestionable. The FGD participants have reported that women were significantly involved in animal feed preparation, fattening, and dairy practices, and their cumulative contribution in the success of the project outcomes has been more significant than their male counterparts. Women were found to be best suited in caring for animals on timely basis and the task of feeding has been routinely undertaken by women. Thus, the project's relevance in this regard has been evident. Overall, the project's relevance in terms of being in line with beneficiary demands and government policies, as well as the targeting of kebeles and households, was found to be highly relevant and satisfactory.

Project Efficiency

Respondents also mentioned that they were provided with budget utilization reports on a periodic basis which created enhanced transparency and gave them an opportunity to know the progress of the project in comparison to the budget utilization. Similarly, responses from the Amhara region have shared the same view with those from the Oromia region. They contend that this project was undertaken with limited cost and the entire process of budget allocation, disbursement, and utilization was fair, transparent, and efficient. Thus, the project has achieved the criteria of efficiency in all woredas.

Budget utilization status of the regions was similar, except Tigray where budget utilization was a bit lower standing at 92.59 percent. This was mainly attributed to political instability sparked in the Tigray region toward the end of the project period (October–December).

Budget utilization status in the Tigray region and some of the activities, such as activity-1 and activity-4 exhibited underutilization. Budget utilization of activities 2, 3, and 5 was 75 percent and above.

Overall, budget utilization status of the FEED III project was excellent. The project management team made decisions that facilitated timely budget utilization. For instance, the underutilized budget was shifted from the Tigray to Oromia region. In cases of unexpected incidences that could affect project implementation, it is a wise and expected decision to shift an underutilized budget from one budget code to another, from one activity to another, or from one project region to another.

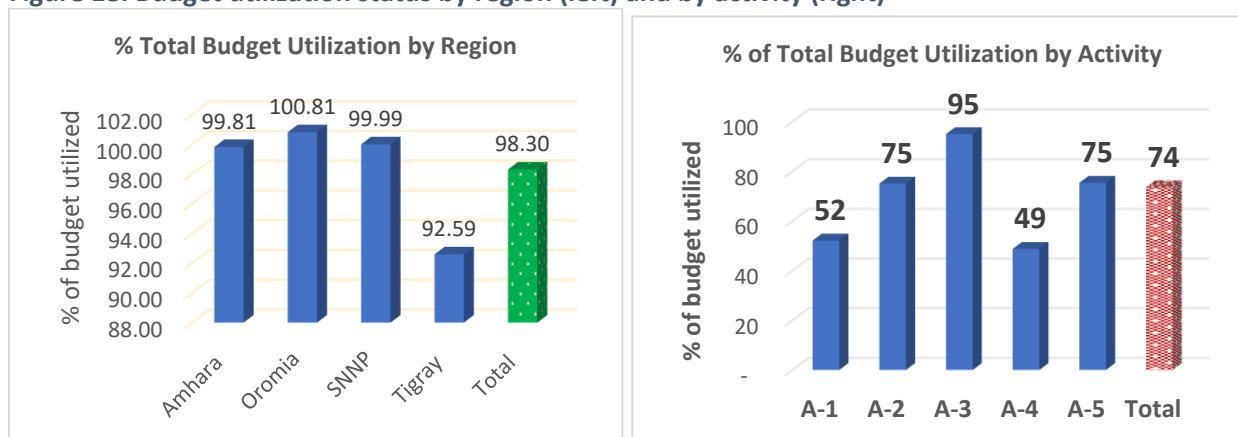
Table 58. FEED III project budget utilization status of regions in the project period (Ethiopian Birr)

Regional state	Total project budget	Total expenditure	Balance	% of utilization
Amhara	39,127,381.07	39,053,978.40	73,402.67	99.81
Oromia	39,127,381.07	39,442,814.73	(315,433.66)	100.81
SNNP	39,127,381.07	39,123,733.69	3,647.38	99.99
Tigray	39,127,381.07	36,228,115.23	2,899,265.84	92.59
Overall	156,509,524.28	153,848,642.05	2,660,882.24	98.30

Table 59. FEED III project budget utilization status by activity (Ethiopian Birr)

Project activity	Total project budget	Total expenditure	Balance
Activity 1 - Feed Ingredient Supply Chain	7,000,000.00	3,645,516.73	3,354,483.27
Activity 2 - Grow Feed Sector Enterprises	30,490,000.00	22,836,004.96	7,653,995.05
Activity 3 - Sustainable Forage Production	14,360,000.00	13,632,701.72	727,298.28
Activity 4 - Fattening, Dairy, and Poultry Enterprises	8,796,000.00	4,283,580.74	4,512,419.26
Activity 5 - On-Farm Feeding Practices	11,936,000.00	8,989,535.53	2,946,464.47
Total	72,582,000	53,387,339.68	19,194,660.33

Figure 18. Budget utilization status by region (left) and by activity (right)



A-1: Activity, A-2: Activity 2, A-3: Activity 3, A-4: Activity 4, A-5: Activity 5

Project Effectiveness

The bulk of qualitative information from different groups of respondents (key informants and FGDs) in the Oromia region has shown the effectiveness of the project from various angles. They contend that the project has been effective in creating a feed industry for local unions. It increased awareness about livestock feed types and livestock production systems (animal fattening practices, dairy production practices, poultry production, and livestock feeds by livestock types). Respondents are bold enough in speaking out that the project has achieved its objectives as planned in the project document. Besides the capacity that has been built among the beneficiaries, experts, and unions, as well as local government structures, in terms of new methods of feed production and use, it has been beneficial in changing the practice of the traditional way of animal husbandry.

The qualitative data from KIIs of the Oromia and Amhara regions have shown that livestock product highly increased after the intervention of FEED III projects. The demand of concentrated feed and improved forage increased from time to time, which is indicative of an ongoing transfer in technology. In other words, the beneficiaries have already been acquainted with the new technologies and have given up the traditional ways of livestock management. The respondents further indicated that since the demand for dairy products is increasing from time to time, they have benefited from the increasing size of marketable dairy products.

The project has been effective in introducing new forage production technologies, especially on the highland and midland agro-ecological areas, that include improved forage production of alfalfa, elephant

grass, cowpea vetch, and others which are widely observed on the farming fields and backyards of the beneficiary households. The reports indicated that these technologies were introduced by ACDI/VOCA, SLM, and the government's livestock and fishery offices. The demand for these newly introduced technologies is fast growing among local communities, and it brought about a bright prospect to the households to enhance production and get the most out of their endeavors.

However, these technologies have only been introduced in areas where there is adequate water supply or areas with access to irrigable lands. Areas with water scarcity have yet to be addressed with similar interventions. Moreover, it was reported that there is a severe scarcity of forage seeds impeding further multiplication of feeds. Thus, seed scarcity and water supply problems are critical bottlenecks which must be addressed to expand the project's effectiveness. Despite the challenges, respondents have attested in several ways that the project has been effective in achieving its objectives and accrued enormous benefits to the beneficiary communities and to those who operate in the livestock value chain.

One of the outputs related to improved policy and regulatory framework was not delivered in the project period (Annex D3.1). This activity was supposed to be implemented in collaboration with the International Livestock Research Institute (ILRI). One of the approaches to be adopted for this activity was conducting a series of workshops with policymakers drawn from the Ministry of Agriculture (MoA), Agricultural Transformation Agency (ATA), Ethiopian Institute of Agricultural Research (EIAR), and Ethiopian Central Statistics Agency (CSA). However, this was not implemented due to the emergence of COVID-19 in Ethiopia in March 2020. The other reasons included turnover of higher-level policymakers at the MOA. The scientist responsible from the side of ILRI felt seriously sick in the project period and eventually passed away.

The other indicator that suffered underperformance was related to the output "Increased use of improved agricultural technologies and techniques." One of the indicators under this output was "Number of hectares of land under improved techniques or technologies as a result of USDA assistance." The performance of this indicator was only 66 percent. This was because data for this indicator was collected from smallholder farmers through DAs. COVID-19 travel restrictions affected timely collection of data for the project indicators. Apart from the COVID-19 crisis, political insecurity in the Tigray region has exacerbated slow progress for some of the project activities.

The overall achievement of the project was highly satisfactory, as this performance was achieved in the face of two big challenges: 1.) the first year of the project was almost spent for preparation without fully commencing activity implementation; and 2.) the emergence of COVID-19 restricted many of the project's activities from being implemented as planned. A third could even be political instability in the Tigray region. Project management and staff made the utmost efforts to implement most of the activities in the second year of the project.

Table 60. Plan versus achievement of FEED-III project outputs and indicators

Outputs or activity title	Performance indicators	Target plan	Achievement	% of achievement	Reasons for discrepancy, if any
Increased agricultural productivity	Number of individuals receiving short-term agricultural sector productivity or food security training because of USDA assistance	48,768	42,768	88	Farmer training not conducted in Tigray region due to COVID-19 pandemic
	Number of farmers and others who have received training in improved farm management practices (i.e., governance, administration, financial management, recordkeeping) because of USDA assistance	48,768	42,414	87	Same as above
	Number of individuals benefitting directly because of USDA assistance (9,547 trained on sustainable forage development, improved animal feeding and nutrition practices, and improved farm management)	48,768	43,451	89	Same as above
	Number of individuals benefitting indirectly because of USDA assistance	242,200	357,169	147	
Increased leverage of private sector resources	Number of public-private partnerships formed because of USDA assistance (expanding markets for commercial feed)	144	138	96	Same as above
	Value of new public and private sector investments leveraged by USDA assistance (the project objective of expanding markets for commercial feed)	\$256,028 USD	\$402,017 USD	157	
Improved policy and regulatory framework	Number of policies, regulations, and/or administrative procedures in each of the stages of development because of USDA assistance (forage seed certification and voluntary feed certification activities)	5	0	0	
Improved capacity of key groups in the agriculture production sector (co-ops and smallholder farmers)	Number of private enterprises, producer organizations, water user associations, women's groups, trade and business associations, and community-based organizations that applied new technologies or management practices as result of USDA assistance (training was also provided on feed retail business management)	144	138	96	
	Number of farmers who have applied new techniques or technologies introduced by the project (trainings	29,261	38,918	133	

Increased use of improved agricultural technologies and techniques	provided to farmers on improved techniques and technologies related to forage production, livestock, and poultry management)				
	Number of hectares of land under improved techniques or technologies because of USDA assistance (provided training to smallholder farmers in sustainable forage development)	2,000ha	1,313ha	66	
	Value of loans provided because of USDA assistance	\$1,410,000 USD	\$2,385,738 USD	169	
Increased use of financial services	Number of individuals receiving financial services because of USDA assistance	14,112	36,025	255	
Expanded trade of agricultural products (domestic, regional, and international)	Value of sales by project beneficiaries (sold items: dairy, fattening, poultry, and sheep and goat feed products)	\$9,600,000 USD	\$10,647,368 USD	111	
	Volume of commodities sold by project beneficiaries (sold products: dairy concentrate, fattening concentrate, poultry concentrate, and sheep and goat concentrate)	38,400 MT	36,098 MT	94	

As revealed in Table 61, over achievement was observed in some of the activities, while underachievement in others, from the perspective of initial plans. Reasons for underachievement have been provided for each of the indicators. The negative effect of COVID-19 impacted many of the indicators, which restricted some of the project activities, especially trainings that were planned for beneficiary farmers.

Assessment of FEED III project outcome level indicators are also presented in Table 66. In outcome 1, there were three indicators for which baseline and end line progresses were measured. The project achieved two out of the three indicators. At the time of baseline study, households owned 4.6 chickens of all breed types (local and improved). Through feed-based interventions and capacity development trainings, beneficiary farmers owned 11.4 chickens at the end of the project. Increasing the productivity of milk was also achieved far more than the 15 percent plan. For instance, the baseline productivity of milk for crossbred cows was 2.2 liters per day per cow. Through feed interventions and trainings facilitated by the FEED III project, this productivity was raised to 4.11 per day per cow at farmers' level, which is an increase of 87 percent.

COVID-19 disrupted the achievement of indicators related to fattening. This was because some of the beneficiaries received trainings recently, after the government lifted its state of emergency (after September). Apart from this, the beneficiaries faced a shortage of forage seeds and seedlings. In some of the locations with moisture stress, the farmers faced a shortage of water. Some other farmers also faced shortage of supplies, such as concentrate feeds. Some of the farmers also claim that they needed more trainings to capture the knowledge and skills of fattening techniques, which help them start or strengthen the fattening business.

Table 61. FEED III outcome indicators, baseline and end line values

Outcome-1: Increased agricultural productivity		Definition	Baseline benchmark values	End line values	Remarks
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/HH: Total = 1.77	1.39 (a decline by 21 percent)	The project didn't achieve this target.
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 = 4.6	11.4 (an increase by 148 percent)	This is over-achievement of the project.
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	Average quantity (liters) of milk produced/milking cow/day: Indigenous = 1.51	Indigenous = 1.99 (an increase by 32 percent) Crossbred = 4.11 (an increase by 87 percent)	The project has achieved this target.

		percentage increase over the measured baseline. Unit: Percent	Crossbred = 2.20		
Outcome-2: Expanded trade of agricultural products		Definition	Baseline benchmark values	End line values	Remarks
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 the project to compare. Unit: Percent	Sales of indicated products/year/HH (birr): Poultry = 2,371.40 Milk/milk products = 2,544.10 Eggs = 796.10 Total = 5,711.60 ETB	Poultry = 3,013.70 Milk/milk products = 19,419 Eggs = 1,834.30 Total = 24,267 ETB	This is over-achievement of the project.

The performances of FEED III intermediate results are also presented in Annex D3.3. There were three key indicators for the results to which the project has made good progress. For instance, the project has contributed to increases of forage area from a baseline of zero to 0.23ha. The proportion of farmers who have applied new techniques introduced by the project also reached 91 percent during the project period. All the cooperatives from the project have also adopted the practice of recordkeeping.

Table 62. Performance of FEED III intermediate results

Intermediate results	Project target	Indicator definition	Baseline benchmark value	End line values
FFPr 1.1 IR-1.1 Improved Quality of Land and Water Resources				
FFPr-1.1 Indicator-1.1	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 because of the project. Unit: Hectares	Baseline is 0 (i.e., this measures the results of activities to be implemented during the project)	0.23ha
FFPr 1.2 IR-1.2 Increased Use of Improved Agricultural Techniques and Technologies				
FFPr-1.2 Indicator-1	Number of farmers who 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, and 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).	91 percent
FFPr 1.3 IR-1.3 Improved Farm Management (Operational, Financial)				
FFPr-1.3 Indicator-1	Number of farmers who have applied improved farm management	This indicator will estimate, through a representative sample, the number of project	Baseline is 0 (i.e., this measures adoption of practices addressed	100 percent

	practices (in the case of FEED III this indicator considers application of recordkeeping)	farmers who have applied improved farm management practices. Unit: Number	in trainings yet to be conducted).	
--	---	--	------------------------------------	--

Project Outcomes and Impacts

The FGD members in the Oromia and Amhara regions have shared similar views that the project has been instrumental in improving the livelihoods of beneficiary households. It enhanced the production and productivity of milk processing with a concurrent increase in the nutrition, income, and asset holding of the farming households. It was also reported that some of the FEED III project beneficiaries have seen real changes in their livelihood status, as well as their family lifestyle. However, the KIIs also mentioned there are still a significant number of households struggling to give up traditional livestock rearing and demonstrated little outcome.

According to the field reports, there are also formidable challenges to be tackled in the future with regard to poultry production, which are limiting project outcomes and further impacts. These include poultry diseases, poor management practices, lack of proper institutional support (very poor health services), lack of capital to expand chicken production, shortage and high price of feed, marketing problems (seasonality of price), and limited technical advice on breed requirements. Some of the key informants in the Oromia region have also expressed dissatisfaction in the health services and feed price, as there is no adequate immunization of poultry to prevent disease outbreaks. Thus, contagious disease and the soaring price of poultry feed are major problems identified by all zonal respondents in the Oromia region, which they fear could stifle the impacts of the project.

In addition to the responses of FGDs and KIIs presented above in two regions, a field observation in one of the woredas in the Amhara region has shown that the project achieved an outcome by securing animal feeds from year to year. Because of the new technologies, the farmers secured animal feeding over a period that extends beyond a single farming season. During the field visit, data collectors were able to observe, in the backyard of a small farm holder named Emanuel*⁸ (resident of Adet Zuria kebele, Elma'na'Denssa woreda), heaps of crop by-products from last year's harvests.

Some of the Cases of the Project Impact

Case 1:

*"My name is Dani*⁹ from Yilmana Densa District of West Gojam zone, Amhara Region. I am 49 with an adult level of education. My only size of land is half a hectare. I don't have resources and because of this I was suffering from poverty for a longer period of time. Especially after the death of my husband, I was in severe problem of securing my daily food consumption. Because of poverty, two of my daughters migrated to Addis Ababa and my older son has been hired in the neighbor's house. Before the project intervention, I was involved in poultry. However, I was not effective since I used traditional ways to take care of hens. One day all my chickens died of a disease pandemic. While I was hopeless and confused on what to do, extension agents*

⁸*Alias used for privacy.

⁹ *Alias used for privacy.

recruited me to a training organized by the FEED III project. I have got ample knowledge and skills from the training for the training was so practical. Since I had experiences in poultry, I started again by purchasing 100 pullets with Birr 8,000. My income was significantly increased, and my livelihoods started to change in a better way. I decided to expand the business and requested another 200 pullets, but extension agents gave me 100. This time, I have 186 mother hens and, on average, I can get 160 eggs per day. My life has been improved tremendously thanks to the FEED III project."

Case 2:

*"My name is Kaleb*¹⁰ from Yilmana Densa district, Adet Zuria, Amhara region. I am 56 with a 5th grade level of education. I only own a hectare of land. I have learned about taking care of plants and animals from my father. One day, extension agents (DAs) gave me the chance to participate in the project where I have received trainings and got ample experiences. Even though I own a small plot of land, I allocated a quarter of it to grow vetch grass. Since then, we are feeding our animals year-round. I have 5 crossbred cows and they are productive since I can feed them well and that they give birth within a year. They are valuable assets and profitable for me. Last week, for example, I sold one cow for Birr 54,000. I plan to have up to 7 cows to maximize my incomes. Currently, there is no forage problem. I have sold calves for my neighbors, and this time, they are effective. I have brought changes in my livelihood because of the project. I have built my house with corrugated iron/tin roof. Not only my home, but also the corral, kitchen, and shelter for forage are built from tin roof. I have built a house in Adet town that has nine rooms and one big house in which all of them have been rented and I am generating monthly income. My life changed drastically since I engaged with the project."*

Case 3:

"My name is Salim,¹¹ aged 32 from Hanu Jewe Kebele, Shirka Woreda of Arsi Zone, Oromia Region. Some 8 years ago, being hopeless, young in farming, I moved to Saudi Arabia as a haj maker and lived there for three years. After many Ethiopians expelled out from the Saudi, I also returned home and begun to actively participate and help my old Mama. After a while, I tried to save money and bought one crossbred cow and later on got engaged on fattening as well. One day, I got a chance to get involved with an ACDI/VOCA project where they helped me in providing training, forage seeds, and exposed me to experience sharing in various parts of the country. I visited Mr. Ebo*¹² the field, and came up with Desho cuttings and now I am using various forage technologies that increased production and productivity of my livestock. I am now the owner of more than 5 hybrid cows and 3 new hybrid calves. The knowledge and skills I got from ACDI/VOCA trainings and experience sharing have audibly changed my life. Every training given by the project was helpful. The main important benefit I got from the training was the application of animal feed technology. ACDI/VOCA and other partners helped me scale up my farm business. Now, I have built a house and also have around Birr 800,000 in my bank account. Now I am planning to expand my business to poultry production (both pullets and layers)."*

¹⁰ *Alias used for privacy.

¹¹ *Alias used for privacy.

¹² *Alias used for privacy.

Project Sustainability

The issue of sustainability of the project's benefits is well articulated among the key informants who are on the frontline of project implementation and coordination. They are well aware of the needs and possible strategies to maintain the outcomes of the project in the future.

To this end, they reiterated that once the benefits of the intervention are properly understood by beneficiary farmers, facilitating access to improved forage seeds and cuttings, concentrated feeds, technologies to treat dry crop residues, and more, on continual basis, will be a key task ahead of them. They further contend that, even though there is no clear exit strategy set out for the project, as farmers' benefits continue from the introduced knowledge and technology, they vowed to shoulder and effectively discharge the task of taking care of the project benefits. They believe that the project has successfully worked on the software aspects of the farmers, where practical scientific knowledge about every aspect of livestock production was taught, and, hence, it would not be difficult for local government and community institutions to maintain those practical successes and benefits accrued from the project. However, KIIIs from the two regions have expressed similar concerns that the project has been lacking a clear and well thought out exit strategy.

Project Personnel

FEED III has 23 staff, with 5 of them having BSc/BA, 16 having MSc, and 2 of them having PhD levels of education. Appropriate staff qualifications and experiences facilitated the high achievement of project outputs. Even though the project has gone through two big challenges (delays and COVID-19), staff utilized their experiences and qualifications to design effective approaches to accomplish many of the project activities as planned. One of the approaches adopted was capacitating and engaging regional-, zonal-, and woreda-level staff to run the activities on the ground. These staff received TOT trainings, which were later cascaded to lower-level structures.

Annex C: Detailed Evaluation Methodology

Sources and Type of Data

Data for the end line evaluation was generated both from primary and secondary sources. Primary data was collected from targeted smallholder farmers, feed service providers, cooperative unions, agricultural extension workers, feed processors, and enterprises in selected woredas and kebeles of the end line evaluation. In addition, qualitative data was collected through key informant interviews with USDA staff, relevant project staff, and key stakeholders, such as regional woreda staff, cooperative unions, and feed manufacturing enterprises. Focus group discussions were held with smallholder farmers, women, and union/cooperative members of the feed/milk/meat/egg value chains. This also included personal observations of animal feed, poultry, and milk processing areas. The use of multiple sources of data has enabled triangulation of findings across sources.

Secondary data related to the project, including FEED III semi-annual performance reports, project documents, the baseline survey report, the FEED III work plan, the FEED III results framework, and relevant literature, were reviewed to get a clearer picture of the FEED III project's performance.

Methods of Data Collection

Household Survey

The quantitative data for the priority project indicators were collected from project beneficiary and non-beneficiary farmers (livestock keepers) in sample woredas and kebeles. A representative random sample of 1,640 farmers drawn from 12 woredas and 36 kebeles were interviewed using a Computer Assisted Personal Interviewer (CAPI) with the CSPro application. The key variables for the survey are milk production, poultry production, feed production, and adoption of improved dairy, poultry, and livestock fattening practices, such as improved feeds and feeding practices. In general, the household survey covers dairy, animal feed, animal fattening, poultry, gender perspectives in feed management practices, and household dietary diversity. Attention was given to key impact and outcome indicators in the project results framework.

Sample Size Determination for the Household Survey

We used the following sample size determination formula to estimate project impact from the household survey. We used a baseline average percentage of households engaged in milk production, animal fattening, and poultry to estimate the sample size. The baseline proportion of households that participate in the three value chains was 42 percent, and a 10 percentage point increase was assumed to get the desired change of 52 percent. The following sample size determination is used to arrive at the final sample size.

$$n = \frac{deff \times \left[Z_{1-\alpha} \sqrt{2P(1-P)} + Z_{1-\beta} \sqrt{P_1(1-P_1) + P_2(1-P_2)} \right]^2}{(P_2 - P_1)^2}$$

Where:

- P_1 is the value of the indicator (0.42)
- P_2 is the expected value of the indicator $(1+10\%) * P_1 = 0.52$
- $P = (P_1 + P_2) / 2$
- Z_a is the standard normal deviate value for a type I error and $Z_{1-\beta}$ is the standard normal deviate value for a type II error
- $Deff$ is the design effect; in the case of multi-stage cluster sample design = 3
- $Z_{1-\alpha}$ (where α = Type 1 error) is 1.96, and $Z_{1-\beta}$ (where β = statistical power to detect an increase or a one-sided change) is 0.90

Using the above formula, 1,561 was the estimated sample size. Considering a 5 percent non-response, and rounding off, the overall sample size was 1,640. Assuming fair distribution across regions and a 67 percent beneficiary (project recipient HHs) and 33 percent non-beneficiary (non-project recipient HHs) ratio, 1,100 households were drawn from intervention woredas and the remaining 540 were picked from non-intervention kebeles.

Qualitative Methods of Data Collection

Qualitative methods were used to complement the findings of the quantitative methods. Key informant interviews (KIIs), focus group discussions (FGDs), in-depth interviews, field observation, and case success stories were the qualitative data collection methods used.

Focus group discussions: Like the baseline survey, FGDs were held with adult women, adult men, youth feed growers, and farmers engaged in fattening, dairy, and poultry production. The kebele leaders and extension agents were consulted to select the target farmers and facilitate access to the targets. Special care was taken to ensure the sample FGD participants were individuals knowledgeable about the target value chains and FEED III project activities. Furthermore, the task was carried out by experienced male and female qualitative data collectors who can lead the discussion and solicit the required information.

These FGDs provided both complementing and diverging views about the performance of FEED III and its prospects. Pre-determined discussion guides were used for each type of FGD. Considering the COVID-19 pandemic, the FGD size was set at 5 to 8 participants. In conducting the FGDs, special safety measures to prevent transmission of the virus, such as using face masks, sanitizers, and social distancing, were strictly followed.

Key informant interviews: KIIs were carried out with program staff, including USDA staff, relevant FEED III technical staff, and key stakeholders from federal, regional, zonal, and woreda levels of government.

These KIIs allowed the end line evaluation team to obtain relevant information on the project, policy and regulatory framework issues, strengths, weaknesses, capacity gaps, opportunities, and COVID-19 impacts on the project's implementation and outcomes. Like the FGDs, in conducting the KIIs, special safety measures to prevent transmission of the virus were followed.

In-depth personal interviews (IDIs): In-depth interviewing was a qualitative research technique that involved conducting intensive individual interviews with a small number of respondents living within the community who benefited directly or indirectly from the FEED III project. Interviews explored their perspectives on the project's performance. This generated details on qualitative project benchmark

indicators, which were not perceived/revealed by the participants in the FGDs, KIIs, and household surveys. In a close collaboration with the FEED III project team, representatives and local officials, our supervisors, and qualitative data collectors selected informants for IDIs, including feed manufacturing units of the Farmers Cooperatives Unions (FCUs) established by the FEED I and FEED II projects, feed ingredient suppliers, agro-dealers, forage nursery enterprises, and livestock development agents.

Field direct observation: Direct observation was carried out in the selected study woredas/kebeles to document the observable facts of the FEED III project intervention. In collaboration with project staff, relevant government offices, development agents, and other relevant individuals in each kebele, field observations were conducted using checklists. The observation on selected FEED III project sites focused on forage production, communal grazing areas, animal fattening, dairy processors, feed marketplaces, feed processors, poultry sites, on-farm innovative feeding practices, primary cooperative-based enterprises, and indigenous and adoptive forage management practices, which provided valuable insights and perceptions for the project. The observed cases were documented in the form of photographs.

Case story: Case stories of exemplary project achievements were collected. Those storytellers (from feed, livestock, and poultry value chain node) were selected in coordination with FEED III project team representatives, local leaders, kebele extension workers, and field teams.

The exemplary individuals were selected considering household head (woman-headed got priority), individuals involved in environmentally friendly livestock, poultry, and feed production practices, innovative practices (practicing indigenous but effective technology and adopting new technology), and other criteria compatible with the project objectives.

This also required the willingness of respondents to be included in photographs and video recordings for the case stories. The evaluator performed two case stories per target area, and, therefore, a total of six case stories covering three project regions.

Data Collection Procedures and Quality Controls

The data gathering team worked together and traveled within a defined woreda from one kebele to the next. The entire team joined a kebele together as a procedure and then separated into the allocated households within that kebele. This allowed easy supervision and made it easier for the kebele guides to effectively lead each interviewer to their assigned household.

Using the Interviewer's Assignment Sheet, supervisors assigned households and interviewees for data collection based on the lists within each study area. The Interviewer's Assignment Sheet also served as a summary of the results of each interviewer's work in the field for each household/interviewee. At the end of each data collection day, the interviewer recorded final outcomes for all household visits and individual interviews conducted. The supervisor compared the results on the assignment sheet with the completed questionnaires/checklists/observed sites as a way of verification, in addition to spot-checks, surprise visits, and re-interviewing.

Field staff took on both the listing and the actual survey, which facilitated easy tracking of the households. In updating the sampling frame (based on the ToR sampling frame constructed during the baseline survey), local guides (like development agents) were consulted. In addition, other social networks were

used to identify the identities and location of the respondents. Local concerned government bodies helped to identify the selected respondents/informants. In case the primary target of the survey in the household was not available during the first visit, enumerators re-scheduled a follow-up visit on separate days before reporting a non-response. To increase the response rate, the informants were well informed through a targeted campaign using development agents and kebele administrators.

The enumerators and qualitative data collectors (keeping their social distance and using a face mask) give a clear and brief introduction to the respondents about the objective of the survey before they start the actual interview. The consulting team prepared a short statement for an introductory message so that each data collector provided similar and consistent information about the objective of the evaluation and how the data were used. Enumerators/data collectors only proceed with the survey once participant informed consent has been given to respondents.

Methods of Data Analysis

Results from the end line survey were analyzed, summarized, and presented in multiple statistical forms, including descriptive statistics (mean, mode, median, standard deviation, minimum, maximum, range) and detailed tabulation of results along the end line objectives in the form of percent, number, ratio, indices value, and amount. The statistical outputs were presented in the form of figures, frequency tables, and radar diagrams. The findings are also presented using the difference of difference approach (i.e., comparison of baseline against end line and beneficiary against non-beneficiary households).

The qualitative information was thematically analyzed with a focus on description of information, classification, and making connections (i.e., three key qualitative analysis strategies). The qualitative information was meant to support findings from the household survey, which cannot be explained quantitatively. In this case, key points were coded and organized into categories and subcategories that represented further analysis based on observed information, which was used to strengthen the interpretation of the quantitative findings.

Annex D: Data Collection Tools

D1 Household Survey Questionnaire

FINAL EVALUATION FOR THE FEED ENHANCEMENT FOR DEVELOPMENT OF ETHIOPIA (FEED-III)

A HOUSEHOLD SURVEY QUESTIONNAIRE

Informed Consent

Dear respondent:

Good morning/afternoon! My name is [YOUR NAME] and I am working as part of the data collection team assigned by ACDI/VOCA. We are conducting a final evaluation to assess whether the project has achieved the expected objectives. You are being asked to participate in this final evaluation survey because of your participation in the project as beneficiary or your participation in livestock production. I will ask you a series of questions that would take about 45 to 50 minutes. Your responses will be presented as a summary and used for development purposes only. It is your choice whether or not to take part in this interview, and if you choose to participate, you have the right to not answer any question or to stop the interview at any time. If you do not choose to participate, it will in no way impact your relationship with ACDI/VOCA or the government. Before we begin, do you want to ask me any questions about the survey? Shall I continue in asking you each question?

1=Yes, 2=No; If "Yes," continue the interview, if "No," thank the respondent and end the interview.

MODULE 1: HOUSEHOLD IDENTIFICATION

S.No.	Questions	Code Description
M1.0	Is the respondent a "FEED III beneficiary?"	1 = FEED III Beneficiary 2 = Not FEED III Beneficiary
M1.1	Household identification No.	_____
M1.2	Region	1 = Tigray, 2 = Amhara, 3 = Oromia, 4 = SNNP
M1.3	Zone	1 = Western, 2 = Southern, 3 = Central, 4 = South East, 5 = West Gojam, 6 = South Gonder, 7 = Awi Zone, 8 = East Gojam, 9 = West Shewa, 10 = Arsi, 11 = Surrounding Finfinee, 12 = East Shewa, 13 = Sidama, 14 = Hadiya, 15 = Wolaita, 16 = Gamogofa
M1.4	Woreda	1 = Tsegede, 2 = Alamata, 3 = Tahitay-maychew, 4 = Hintalo Wajirat, 5 = Lay Gayent, 6 = Guangua, 7 = Awabel, 8 = Yilmana Densa, 9 = Toke Kutaye, 10 = Shirka, 11 = Mulo, 12 = Bosset, 13 = Aleta Wondo, 14 = Misrak Badawacho, 15 = Boloso Sore, 16 = Bonke
M1.5	Kebele	_____
M1.6	Intervention status	1 = intervention, 2 = control
M1.7	Sex of household head	1 = Male, 2 = Female
M1.8	Are you or any member of your household a member of a cooperative union?	1 = yes 2 = no

M1.9	Co-op/union type	1 = Livestock and livestock products 2 = Multi-purpose
M1.10	Date of interview	_____
M1.11	Enumerator	Name_____

MODULE 2: HOUSEHOLD DEMOGRAPHICS

S.No.	Question(s)	Code Description
M2.1	Is the respondent the head of the household?	1 = Yes 2 = No
M2.2	Age of the household head in years	_____
M2.3	Level of education of the household head	1 = Illiterate 2 = Informal education (religious, adult education) 3 = Primary 4 = Secondary 5 = Above secondary
M2.4	Marital status of the household head	1 = Single 2 = Married 3 = Widowed 4 = Divorced 5 = Separated 6 = Other (Specify)
M2.5	Household size (write number)	1 = Male _____ 2 = Female _____ 3 = Total _____
M2.6	Number of underage household members (0 to 17 years) (write number)	_____
M2.7	Number of economically active household members (18 to 64 years) (write number)	_____
M2.8	Number of old age members (above 65 years) (write number)	_____
M2.9	Total land size owned by the household in hectare (2012 E.C)	_____
M2.10	Total land cultivated (own, rented, or shared) in hectare during the 2012 E.C production seasons (meher and belg)	_____

MODULE 3: HOUSEHOLD LIVELIHOOD ACTIVITIES AND INCOME SOURCES

[Please indicate the type of livelihood activities involved in and estimated annual income earnings for all household members during the last 12 months]

S.No.	Livelihood activities	Has any household member participated in [<i>livelihood activity</i>] during the last 12 months? 1 = Yes, 2 = No	Estimated annual income earned in Birr during the last 12 months
M3.1	Crop production		

M3.2	Fruit production		
M3.3	Vegetable production		
M3.4	Root crop production		
M3.5	Dairy production		
M3.6	Animal fattening		
M3.7	Poultry production		
M3.8	Off-farm activities		
M3.9	Non-farm activities		
M3.10	PSNP or other transfer		
M3.11	Remittance/gift		
M3.12	Beekeeping		
M3.13	Perennial crops		
M3.14	Wild products		
M3.15	Enset production		
M3.16	Others (specify)		

Livestock production and sale during the last 12 months

SN	Type of livestock	Does the household own [<i>livestock type</i>] currently? 1 = Yes 2 = No [<i>Skip to number sold</i>]	Number of indigenous breeds owned	Number of crossbreeds owned	Total number of livestock owned currently (<i>auto sum</i>)	Estimated current value of the total livestock if sold, in Birr	Number of livestock sold during the last 12 months	Total value of livestock sold during the last 12 months, in Birr
M3.17	Cow							
M3.18	Ox							
M3.19	Bull							
M3.20	Heifers (6 months to first calf)							
M3.21	Male cattle (6 months to 2 years)							
M3.22	Calf (male < 6 months)							
M3.23	Calf (female < 6 months)							
M3.24	Sheep							
M3.25	Goats							
M3.26	Chickens							
M3.27	Horses							
M3.28	Mules							
M3.29	Donkeys							
M3.30	Camels							
M3.31	Pigs							

MODULE 4: DAIRY PRODUCTION

S.No.	Question(s)	Code Description
M4.1	Did your household participate in dairy production during the last 12 months?	1 = Yes 2 = No [Skip to Module 6/animal fattening, if “No,” to question # M4.1]
M4.2	How many lactating indigenous cows have you owned in the last 12 months?	_____
M4.3	How many lactating crossbred cows have you owned in the last 12 months?	_____
M4.4	Total amount of milk collected per day in liters from all indigenous cows?	Maximum _____ Minimum _____
M4.5	Total amount of milk collected per day in liters from all crossbred cows?	Maximum _____ Minimum _____
M4.6	Average number of months of lactation per indigenous cow in a single lactation period?	_____
M4.7	Average number of months of lactation per crossbred cow in a single lactation period?	_____
M4.8	Who in the household decides on the sales of dairy products?	1. Male household members 2. Female household members 3. Both men and women equally
Cow feeding and management practice		
	What technologies or management practices did you apply in dairy farming? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = Improved breeds 2 = Artificial insemination 3 = De-Worming 4 = Vaccinations 5 = Supplements 6 = Improved feeding 7 = Interval calf-weaning 8 = Veterinarian services 9 = Livestock housing 10 = Waste management practices 11 = Feedlots 12 = Weighing 13 = Marketing information 14 = Financial management 15 = Others (specify) _____
M4.9	What types of feed did you feed your milk cow during the last 12 months? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = Concentrate feed 2 = Agro-industrial by-products (wheat bran, nug cake, etc.) 3 = Other high-quality feed (Atela, grains) 4 = Green forage, grass, hay, silage 5 = Crop residue (teff straw, wheat straw, maize stover, and others) 6 = Other (specify) _____
M4.10	What type of animal feed preservation and storage practices do you use for your dairy cows? [Circle all that apply]	1 = Hay making 2 = Bailing 3 = Silage

	<p><u>[MULTIPLE RESPONSE]</u></p> <p><u>[DO NOT READ OUT OPTIONS]</u></p>	<p>4 = Other (specify) _____</p> <p>5 = Don't know / Didn't use any</p>
M4.11	<p>What equipment have you used for watering and feeding activities?</p> <p><u>[MULTIPLE RESPONSE]</u></p> <p><u>[DO NOT READ OUT OPTIONS]</u></p>	<p>1 = Feeding trough</p> <p>2 = Watering trough</p> <p>3 = Other (specify) _____</p>
M4.12	<p>What type of physical and chemical treatment of feed did you use for your dairy cows?</p> <p><u>[MULTIPLE RESPONSE]</u></p> <p><u>[DO NOT READ OUT OPTIONS]</u></p>	<p>1 = Cut and carry</p> <p>2 = Crop residue treatment</p> <p>3 = Chopping</p> <p>4 = Other (specify) _____</p> <p>5 = Don't know / Didn't use any</p>
M4.13	<p>What type of feeding practices have you implemented for your dairy cows?</p> <p><u>[MULTIPLE RESPONSE]</u></p> <p><u>[DO NOT READ OUT OPTIONS]</u></p>	<p>1 = Cut and carry</p> <p>2 = Rotational grazing</p> <p>3 = Open grazing</p> <p>4 = Feeding of factory produced formulated feed</p> <p>5 = Mixed or balanced ration feeding</p> <p>6 = Other (specify) _____</p>
M4.14	<p>Did you/your household member receive any training in dairy animal nutrition and management during the last 12 months?</p>	<p>1 = Yes</p> <p>2 = No</p> <p>[Skip to question # M4.17, if "No," to question # M4.15]</p>
M4.15	<p>If yes for question # M4.14, who has provided the training to you?</p> <p><u>[MULTIPLE RESPONSE]</u></p> <p><u>[DO NOT READ OUT OPTIONS]</u></p>	<p>1 = Co-op/Union</p> <p>2 = Private enterprise</p> <p>3 = Government</p> <p>4 = NGOs</p> <p>5 = Don't know the provider</p> <p>6 = Other (specify) _____</p>
M4.16	<p>If yes for question # 4.14, who received the training?</p> <p><u>[MULTIPLE RESPONSE]</u></p> <p><u>[DO NOT READ OUT OPTIONS]</u></p>	<p>1 = Household head</p> <p>2 = Spouse</p> <p>3 = Both head and spouse</p> <p>4 = Head and another household member</p> <p>5 = Another household member</p> <p>6 = Other (specify) _____</p>
	<p>FILTER:</p> <p>ASK THIS QUESTION IF THE RESPONSE TO QUESTION M1.0 IS "1 = FEED III Beneficiary"</p> <p>Are you receiving any direct ACDI/VOCA FEED III intervention on dairy production since 2017?</p>	<p>1 = Yes</p> <p>2 = No</p>
	<p>If yes, which intervention?</p> <p><u>[MULTIPLE RESPONSE]</u></p> <p><u>[DO NOT READ OUT OPTIONS]</u></p>	<p>1 = Training</p> <p>2 = Technical assistance</p> <p>3 = Linkage to market</p> <p>4 = Equipment</p>

		5 = Fencing 6 = Access to finance 7 = Training videos 8 = Forage seeds 9 = Other (specify)_____
--	--	---

Household dairy production and income

	Product type	Did the household produce [product] during the last 12 months? 1 = Yes, 2 = No	If yes, what is the amount produced during the last 12 months in kg?	Amount consumed at home in kg	Amount used for other purposes in kg	Have you sold any of the following product type? 1 = Yes, 2 = No [skip to next]	If yes, quantity sold in kg	What was the average price sold?	What is the total value sold, in Birr?
M4.17	Milk								
M4.18	Yogurt								
M4.19	Butter								
M4.20	Cheese								

- M4.21** Where do you sell your dairy products? **MULTIPLE RESPONSE** [DO NOT READ OUT OPTIONS]
1 = Farm gate, 2 = Local market, 3 = Co-op/Union, 4 = Milk collection business, 5 = Milk processors,
6 = Other (specify)

Household members' participation [mostly] in dairy production tasks [circle all that apply]/Tick on [1]				
	Tasks	Adult male	Adult female	Children under 18
M4.22	Cleaning the cows' house	1	1	1
M4.23	Feeding the cows	1	1	1
M4.24	Forage collection	1	1	1
M4.25	Concentrate feeds purchasing	1	1	1
M4.26	Factory ingredients purchasing	1	1	1
M4.27	Milking	1	1	1
M4.28	Milk processing (butter, cheese)	1	1	1
M4.29	Selling cows and calves	1	1	1
M4.30	Selling dairy products	1	1	1
M4.31	Calf feeding and management	1	1	1
M4.32	Watering	1	1	1
M4.33	Cow cleaning	1	1	1
M4.34	Udder washing	1	1	1
M4.35	Other (specify)	1	1	1

Challenges in dairy production [Circle all that apply]/Tick on [1]		
	Challenges faced during the last 12 months	1 = Yes, 2 = No
M4.36	Shortage of concentrate feed	1
M4.37	Land problem/limited land size	1
M4.38	Disease prevalence	1

M4.39	Lack of crossbred cows	1
M4.40	Lack of cooling and storage facilities at milk vending sites	1
M4.41	Water availability problem	1
M4.42	Low milk price	1
M4.43	High feed price	1
M4.44	Lack of knowledge for modern dairy cow management	1
M4.45	Limited access to credit	1
M4.46	Other (specify)_____	1

MODULE 5: DAIRY VALUE CHAIN

S.No.	Question(s)	Code Description
M5.1	Did your household purchase dairy concentrate feed for your milk cow during the last 12 months?	1 = Yes 2 = No [Skip to Module 6/animal fattening, if “No,” to question # M5.1]
M5.2	Who decides on concentrate feed purchase?	1 = Mainly men only 2 = Mainly women only 3 = Both men and women equally
M5.3	Who are the individuals/organizations involved in the dairy production in your locality? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = Input suppliers like forage seed, vet drugs, AI service, vaccine 2 = Market and processing (processors, market agents, shops, milk collection center) 3 = Production service providers like extension, forage production, hay producers, research support, etc. 4 = Wholesalers, retailers, and consumers 5 = Other (specify)_____

	Type of feed purchased/used during the last 12 months	Quantity purchased over the last 12 months	Unit 1 = KG 2 = Liter 3 = Number 4 = Kimir 5 = Chinnet 6 = Esir 7 = Shekim 8 = Other (specify)	Average unit price in Birr	Total value purchased (Birr)	What is the main source of feed? <i>[multiple response possible]</i> 1 = Co-op/Union enterprise, 2 = Agro-processors (flour factory, oil factory, etc.), 3 = Traders or agro dealers, 4 = Government, 5 = Feed manufacturers, 6 = Own production, 7 = Other farmers, 8 = NGOs, 9 = Other (specify)_____
M5.4	Dairy concentrate feed					
M5.5	Noug cake					
M5.6	Cottonseed cake					

M5.7	Other cake					
M5.8	Wheat bran					
M5.9	Other bran					
M5.10	Maize					
M5.11	Pulse bran					
M5.12	Molasses					
M5.13	Green forage					
M5.14	Grass					
M5.15	Hay					
M5.16	Silage					
M5.17	Crop residue					
M5.18	Atela (Tela, Areke, Teji)					
M5.19	Other (specify)					

S.No.	Question(s)	Code Description
M5.20	How long does it take to reach concentrate feed sales/distribution point from your house? (average walking distance in minutes per single trip)	_____
M5.21	Do you think there are an adequate number of concentrate feed sales/distribution channels that fulfill the feed demand of the farmers in your area?	1 = Yes, 2 = No
M5.22	If no for question # M5.19 , what are the reasons? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = It serves too many farmers 2 = The service is too far/not accessible 3 = Unbalanced supply and demand 4 = Other (specify)_____
M5.23	Have you ever accessed feed market information in the last 12 months?	1 = Yes 2 = No (skip to question # M5.24)
M5.24	If yes for question # M5.21 , what was your source of information? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = Local feed traders 2 = Feed suppliers 3 = Development Agents 4 = Fellow farmers 5 = Community meeting 6 = Radio 7 = Text message 8 = Mobile call 9 = Other (specify)_____
M5.25	Was the concentrate feed adequate to properly feed your milk cow during the last 12 months?	1 = Yes, 2 = No [Skip to question # M5.28, if “Yes,” to question # M5.24]
M5.26	If no for question # M5.24 , what was the problem? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = High price 2 = Low quality 3 = Limited supply 4 = Other (specify)_____

M5.27	What strategies did you follow if you think that you do not access enough feed for your dairy cows? <u>[MULTIPLE RESPONSE]</u> <u>[DO NOT READ OUT OPTIONS]</u>	1 = Reduce the quantity of feed given to cattle 2 = Shift to own production 3 = Use some other feed materials 4 = Other (specify) _____
M5.28	What do you think are the possible consequences of the limited access to feed for dairy production? <u>[MULTIPLE RESPONSE]</u> <u>[DO NOT READ OUT OPTIONS]</u>	1 = Reduced in the quality of production 2 = Reduced in the quantity of production 3 = Decreased income from dairy products 4 = Dairy health effects 5 = Other (specify)
M5.29	Was the price of concentrate feed for dairy production affordable to you?	1 = Yes, 2 = No
M5.30	Did the price of dairy concentrate feed fluctuate across time in the last 12 months?	1 = Yes, 2 = No
M5.31	Did you check the quality of concentrate feed purchased for dairy production?	1 = Yes, 2 = No
M5.32	If your answer is yes for question # M5.30 , how did you check the quality?	1 = Through quality check services in the laboratory 2 = Through physical detection using indigenous knowledge 3 = Through physical detection by livestock experts 4 = Other (specify)

MODULE 6: FATTENING

S.No.	Question(s)	Code Description
M6.1	Did your household participate in animal fattening during the last 12 months?	1 = Yes 2 = No [Skip to Module 8/poultry production, if “No”]
M6.2	Who in the household made the decisions about the fattened animals?	1 = Male only 2 = Female only 3 = Both men and women equally
M6.3	Did you buy any animals for fattening during the last 12 months?	1 = Yes 2 = No [Skip to question # M6.7, if “No,” to question # M6.3]
M6.4	If yes for question # M6.3 , how much did it cost to buy cattle (average price to buy one cattle for fattening)? (write in Birr)	_____
M6.5	If yes for question # M6.3 , how much did it cost to buy sheep (average price to buy one sheep for fattening)? (write in Birr)	_____

M6.6	If yes for question # M6.3 , how much did it cost to buy goat? (average price to buy one goat for fattening) (write in Birr)	_____		
	Description	Type of Animal Fattened		
		Cattle	Sheep	Goat
M6.7	Number of fattened animals during the last 12 months (write number)			
M6.8	Typical length of fattening period for an animal (write in days)			
Animal feeding and management practice [Circle all that apply]				
M6.9	What types of feed did you feed your fattening animal during the last 12 months? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = Concentrates feed 2 = Agro-industrial by-products (wheat bran, nug cake, etc.) 3 = Other high-quality feed (<i>Atela</i> , grains) 4 = Green forage, grass, hay, silage 5 = Crop residue (teff straw, wheat straw, maize stover, and others) 6 = Other (specify)_____		
M6.10	What type of animal feed preservation and storage practices do you use for your fattening? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = Hay making 2 = Bailing 3 = Silage 4 = Other (specify)_____ 5 = Did not know or did not use any		
M6.11	What is the equipment you have used for drinking and feeding activities? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = Feeding trough 2 = Water trough 3 = Other (specify) _____		
M6.12	What type of feeding practices have you implemented for your fattening? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = Rotational grazing 2 = Feeding of factory produced formulated feed 3 = Mixed or balanced ration feeding 4 = Other (specify)_____		
M6.13	Did you/your household member receive any training in animal fattening during the last 12 months?	1 = Yes 2 = No [Skip to question # M6.19, if "No," to question # M4.16]		
M6.14	If yes for question # M6.13 , who has provided the training to you? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = Co-op/Union 2 = Private enterprise 3 = Government 4 = NGO 5 = Other (specify)_____		
M6.15	If yes for question # 6.13 , who received the training?	1 = Self 2 = Spouse 3 = Both self and spouse		

		4 = Other household member (specify)
M6.16	<u>FILTER: ASK THIS QUESTION IF THE RESPONSE TO QUESTION M1.0 IS "1 = FEED III Beneficiary"</u> <u>Are you receiving any direct ACIDI/VOCA FEED III intervention on fattening?</u>	1 = Yes 2 = No
	<u>If yes, which interventions did you receive?</u> <u>[MULTIPLE RESPONSE]</u> <u>[DO NOT READ OUT OPTIONS]</u>	1 = Training 2 = Technical assistance 3 = Linkage to market 4 = Equipment 5 = Fencing 6 = Access to finance 7 = Other (specify)_____

Household members' participation [mostly] in animal fattening tasks [Circle all that apply]/Tick on [1]				
	Tasks	Adult male	Adult female	Children under 18
M6.17	Cleaning the animal house	1	1	1
M6.18	Feeding the fattening animal	1	1	1
M6.19	Forage collection	1	1	1
M6.20	Concentrate feed purchasing	1	1	1
M6.21	Factory ingredients purchasing	1	1	1
M6.22	Watering	1	1	1
M6.23	Cattle cleaning	1	1	1
M6.24	Selling fattened animal	1	1	1
M6.25	Other (specify)_____	1	1	1

Challenges in animal fattening [Circle all that apply]/Tick on [1]		
	Challenges	Responses
M6.26	Shortage of animal feed	1
M6.27	Limited animal health services	1
M6.28	Formal trade competes with substantial informal trade	1
M6.29	Livestock disease	1
M6.30	Lack of access to concentrate feed	1
M6.31	Unpredictable cattle market	1
M6.32	Lack of knowledge on improved cattle fattening	1
M6.33	Lack of improved fodder for livestock fattening	1
M6.34	Limited access to credit	1
M6.35	Lack of market linkages	1
M6.36	Other (specify)	1

MODULE 7: FATTENING VALUE CHAIN

S.No.	Question(s)	Code Description
M7.1	Did your household purchase animal concentrate feed for fattening animals during the last 12 months?	1 = Yes 2 = No

		[Skip to Module 8/poultry production, if “No,” to question # M7.1]
M7.2	Who decides on the concentrate feed purchase in the household?	1 = Wife only 2 = Husband only 3 = Jointly (both) 4 = Children under 18 5 = Other (specify)
M7.3	Who are the individuals/organizations involved in the animal fattening during 12 months in your locality? <u>[MULTIPLE RESPONSE]</u> <u>[DO NOT READ OUT OPTIONS]</u>	1 = Producers 2 = Collectors 3 = Small private and cooperative fatteners/feedlots 4 = Middlemen/brokers 5 = Livestock trading cooperatives 6 = Individual traders and exporters 7 = Other (specify) _____

	Type of feed purchased (specify feed purchased during the last 12 months)	Quantity purchased in the last 12 months	Unit 1 = KG 2 = Liter 3 = Number 4 = Kimir 5 = Chinnet 6 = Esir 7 = Shekim 8 = Other (specify)	Average unit price	Total value purchased (Birr)	Main Source of feed 1 = Cooperatives/Union enterprise 2 = Own production 3 = Agro-processors (flour factory, oil factory, etc.) 4 = Feed manufacturers 5 = Traders/Private enterprises 6 = Government 7 = Other farmers 8 = Agro-dealers (private) 9 = NGOs 10 = Other (specify)
M7.4	Animal concentrate feed					
M7.5	Oil seed cake					
M7.6	Wheat bran					
M7.7	Pea bran					
M7.8	Maize					
M7.9	Pulse bran					
M7.10	Molasses					
M7.11	Green forage					
M7.12	Grass					
M7.13	Hay					
M7.14	Silage					

M7.15	Crop residue					
M7.16	Atela (Tela, Areke, Teji)					
M7.17	Other (specify)					

S.No.	Question(s)	Code Description
M7.18	How long does it take to reach a concentrate feed sales/distribution point from your farm? (average walking distance in minutes for a single trip)	_____
M7.19	Do you think that these sales/distribution channels/points are enough?	1 = Yes, 2 = No
M7.20	If no for question # M7.20 , what are the reasons? [circle all that apply]	1 = It serves too many farmers 2 = The service is too far/not accessible 3 = Unbalanced supply and demand 4 = Other (specify)
M7.21	What is length of time to fatten cattle before receiving training?	_____
M7.22	What is length of time to fatten cattle after receiving training?	_____
M7.23	Have you ever accessed feed market information in the last 12 months?	1 = Yes 2 = No (skip to question # M7.26 if "No")
M7.24	If yes for question # M7.24 , what was your source of information? [circle all that apply]	1 = Local feed traders/suppliers 2 = Cooperatives or unions 3 = Development Agents 4 = Fellow farmers (farmer-to-farmer communication) 5 = Community meeting 6 = Local cattle market 7 = Radio 8 = Text message from relatives/friends/government institution/development agent/etc. 9 = Phone call from relatives/friends/government institution/development agent/etc. 8 = Other (specify)
M7.25	Was the concentrate feed adequate (in terms of quantity) to properly feed your cattle?	1 = Yes 2 = No [skip to question # M7.29]
M7.26	If no for question # M7.25 , what was the problem for not being able to get adequate concentrate feed?	1 = High price 2 = Low quality 3 = Limited supply 4 = Other (specify)

M7.27	What strategies did you follow when you were not able to access enough feed for fattening?	1 = Reduce the quantity of feed given to cattle 2 = Shift to own production 3 = Use some other feed materials 4 = Other (specify) 5 = Did not know or didn't use any
M7.28	What do you think are the possible consequences of the limited access to feed for fattening animals? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = Reduced meat quality 2 = Reduced number of cattle fattened 3 = Decreased income from animal fattening 4 = Meat health effects 5 = Other (specify)_____
M7.29	Was the price of concentrate feed for fattening animal affordable to you?	1 = Yes, 2 = No
M7.30	Did the price of concentrate feed for fattening animal fluctuate across time in the last 12 months?	1 = Yes, 2 = No
M7.31	Did you check the quality of feed purchased for fattening animals?	1 = Yes, 2 = No
M7.32	If your answer is yes for question # M7.31 , how did you check the quality?	1 = Through quality check services in the laboratory 2 = Through physical detection using indigenous knowledge 3 = Through physical detection by livestock experts 4 = Other (specify)_____

MODULE 8: POULTRY PRODUCTION

S.No.	Question(s)	Code Description		
M8.1	Did your household participate in poultry production in the last 12 months?	1 = Yes, 2 = No [Skip to Module 10/forage production, if "No," to question # M8.1]		
M8.2	Who makes the decisions about the production and sales of poultry products?	1 = Men only 2 = Women only 3 = Both men and women equally		
M8.3	How do you sell your poultry products?	1 = Directly sell to consumers 2 = Directly sell to small retail traders 3 = Other (specify)_____		
	Type of chicken	Number of chickens kept in the last 12 months		
		Local	Improved	Total
M8.4	Layers			
M8.5	Broilers			
M8.6	Female chickens (Over 3 months of age not laying - Pullet)			

M8.7	Male chickens (Over 3 months of age)			
M8.8	Chicks (up to 3 months of age)			
M8.9	Total (M8.4 to M8.8)			
Poultry feeding and management practice <u>[[MULTIPLE RESPONSE]</u>				
M8.10	What types of concentrate feed did you feed your chicken during the last 12 months? <u>[[MULTIPLE RESPONSE]</u> <u>[[DO NOT READ OUT OPTIONS]</u>	1 = Layers feed 2 = Broilers feed 3 = Grain 4 = Other (specify) _____		
M8.11	What types of management practices do you apply for your poultry production?	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 6 = Other (specify) _____		
M8.12	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		
M8.13	What was the typical total egg production (number of eggs) laid per local hen during the past 12 months (one year), per clutch and then annual?	Per clutch _____ Per year _____		
M8.14	What was the typical egg production (number of eggs) laid per improved hen during the past 12 months (one year)?	_____		
M8.15	What was the total egg production (number of eggs) laid per improved hen and local hen during the past 12 months (one year)?	_____		
M8.16	Have you ever received any training on poultry production during the last 12 months?	1 = Yes, 2 = No [Skip to question # M8.19, if "No," to question # M8.16]		
M8.17	If yes for question # M8.16 , who has provided the training to you? [Circle all that apply]	1 = Co-op/Union 2 = Private enterprise 3 = Government 4 = ACDI/VOCA 5 = NGOs 6 = Other (specify) _____		
M8.18	If yes for question # 8.16 , who received the training?	1 = Adult men 2 = Adult women 3 = Children less than 18		
Annual sales from poultry production				

	Product Type	Quantity sold (No.)	Average unit price sold (Birr)	Total value sold (Birr)
M8.19	Hen			
M8.20	Male chicken			
M8.21	Female chicken			
M8.22	Eggs			
M8.23	Where do you sell your poultry products? [Circle all that apply]			1 = Farm gate 2 = Local market 3 = Co-op/Union 4 = Private Enterprise 6 = Other (specify) _____

Household members' participation [mostly] in poultry production tasks [Circle all that apply]/Tick on [1]				
	Tasks	Adult male	Adult female	Children under 18
M8.24	Chicken house cleaning	1	1	1
M8.25	Vaccination and treatment	1	1	1
M8.26	Egg collection	1	1	1
M8.27	House construction	1	1	1
M8.28	Chicken feeding and watering	1	1	1
M8.29	Chicken and egg selling	1	1	1
M8.30	Other (specify)	1	1	1

Challenges in poultry production [Circle all that apply]/Tick on [1]		
	Challenges	Responses
M8.31	Predators	1
M8.32	Theft	1
M8.33	Lack of improved breed	1
M8.34	High feed price	1
M8.35	Limited vaccination and health service	1
M8.36	Chicken disease	1
M8.37	Chicken concentrate feed supply problem	1
M8.38	Lack of knowledge on poultry production	1
M8.39	Other (specify) _____	1

MODULE 9: POULTRY FEED AND FEEDING

S.No.	Question(s)	Code Description
M9.1	Did your household purchase poultry concentrate feed for your chickens in the last 12 months/three years?	1 = Yes 2 = No [Skip to Module 10/forage production, if "No," to question # M9.1]
M9.2	Who decides on the concentrate feed purchase?	1 = Men only 2 = Women only

		3 = Both men and women equally 4 = Other non-household member
M9.3	Who are the actors in your poultry production in your locality? [circle all that apply]	1 = Consumers at village level 2 = Local middlemen/brokers 3 = Traders 4 = Commercial farmers 5 = Rearing centers 6 = Other (specify)_____

	Type of feed purchased/used during the last 12 months	Total quantity purchased/used in the last 12 months	Unit 1 = KG 2 = Other (specify) _____	Average unit price, if purchased	If purchased, what is the total value purchased (Birr)?	Source of feed 1 = Cooperatives/Union 2 = FCU feed manufacturing enterprise 3 = Own production 3 = Agro-processors (flour factory, oil factory, etc.) 4 = Feed manufacturers 5 = Traders/Private enterprises 6 = Government 7 = Other farmers 8 = Agro-dealers (private) 9 = NGOs 10 = Other (specify)
M9.4	Layers Feed					
M9.5	Broilers Feed					
M9.6	Grain					
M9.7	Other (specify)					

S.No.	Question(s)	Code Description
M9.8	How long does it take to reach a poultry concentrate feed sales/distribution point from your farm? (average walking distance in minutes for a single trip)	_____
M9.9	Do you think that these distribution outlets are enough?	1 = Yes, 2 = No
M9.10	If no for question # M9.9 , what are the reasons? [circle all that apply]	1 = It serves too many farmers 2 = The service is too far/not accessible 3 = Unbalanced supply and demand 4 = Other (specify)
M9.11	Have you ever accessed poultry feed market information in the last 12 months?	1 = Yes 2 = No (Skip to question # M9.14 if “No”)
M9.12	If yes for question # M9.11 , what was your source of information? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = Local feed traders/suppliers 2 = Cooperative union 3 = Development Agents

		4 = Fellow farmers (farmer-to-farmer communication) 5 = Community meeting 6 = Radio 8 = Text message from relatives/friends/government institution/development agent/etc. 9 = Phone call from relatives/friends/government institution/development agent/etc. 10 = Other (specify)
M9.13	Was the poultry concentrate feed adequate to properly feed your chicken?	1 = Yes, 2 = No [Skip to questionn # M9.18, if “Yes,” to question # M9.14]
M9.14	If no for question # M9.13 , what was the problem?	1 = High price 2 = Low quality 3 = Limited supply 4 = Other (specify)_____
M9.15	What strategies did you follow if you could not access enough feed for your poultry production?	1 = Reduce the quantity of feed given to chickens 2 = Shift to own production 3 = Use some other feed materials 4 = Other (specify)_____
M9.16	What do you think are the possible consequences of the limited access to feed your chicken? <u>[MULTIPLE RESPONSE]</u> <u>[DO NOT READ OUT OPTIONS]</u>	1 = Reduced quality of poultry production 2 = Reduced quantity of poultry production 3 = Decreased income from poultry production 4 = Poultry health effects 5 = Other (specify)_____
M9.17	Was the price of concentrate feed for poultry production affordable to you?	1 = Yes, 2 = No
M9.18	Did the price of concentrate feed poultry production fluctuate across time in the last 12 months?	1 = Yes, 2 = No
M9.19	Did you check the quality of feed purchased for poultry production?	1 = Yes, 2 = No
M9.20	If your answer is yes for question # M9.20 , how did you check the quality?	1 = Through quality check services in the laboratory 2 = Through physical detection using indigenous knowledge 3 = Through physical detection by poultry experts 4 = Other (specify)

MODULE 10: FORAGE PRODUCTION

S.No.	Question(s)	Code Description			
M10.1	Did your household participate in forage production in the last 12 months?	1 = Yes 2 = No [Skip to Module 12, if “No,” to question # M10]			
M10.2	Who made the decisions about the production and sales of forage production?	1 = Adult women only 2 = Adult men only 3 = Jointly (both) 4 = Children under 18 5 = Other (specify)			
	Type of forage	Amount of forage produced and consumed in the last 12 months			
		Unit 1 = Kimir 2 = Chinnet 3 = Esir 4 = Shekim 5 = Other	Produced (in unit specified)	Consumed (in unit specified)	Mode of plantation 1 = Over sowing (rehabilitate/enrichment) 2 = Under sowing 3 = Enter/mixed cropping 4 = Along the terrace/border 5 = Sole cropping 6 = Other (specify)
M10.3	Grass annuals				
M10.4	Legumes annuals				
M10.5	Grass perennials				
M10.6	Legumes perennials				
M10.7	Other (specify)				
M10.8	Total land under forage last year (2012 E.C-both seasons) in hectare	_____			
M10.9	What type of improved forage planting/input materials did you use during the last 12 months? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	0 = Not applicable 1 = Seeds 2 = Seedlings 3 = Cuttings 4 = Splits 5 = Fertilizer 6 = Other (specify)			
M10.10	What types of forage feeding practices did you use in your farm? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = Cut and carry 2 = Rotational grazing 3 = Other (specify)			
M10.11	Did you/your household members receive any training on improved forage production during the last 12 months?	1 = Yes, 2 = No [Skip to question # M10.15, if “No,” to question # M10.11]			

M10.12	If yes for question # M 10.11 , what was the focus on the training? <u>[MULTIPLE RESPONSE]</u> <u>[DO NOT READ OUT OPTIONS]</u>	1 = Improved technology/practice of forage production 2 = Pasture/rangeland management 3 = Nursery establishment 4 = Other (specify) _____			
M10.13	If yes for question # M 10.11 , who has provided the training to you? <u>[MULTIPLE RESPONSE]</u> <u>[DO NOT READ OUT OPTIONS]</u>	1 = Co-op/Union 2 = Private enterprise 3 = Government 4 = ACDI/VOCA 5 = Other NGOs 6 = Other (specify) _____			
M10.14	If yes for question # M10.11 , who received the training?	1 = Men only 2 = Women only 3 = Children less than 18			
M10.15	Did you use improved forage planting materials last year?	1 = Yes, 2 = No			
M10.16	If yes for question # M10.15 , please specify the source?	1 = Government 2 = ACDI/VOCA 3 = Other NGOs 4 = Purchased (private seller) 5 = Exchange (farmer-to-farmer) 6 = Other (specify)			
Annual sales from forage products					
	Product Type	Quantity	Unit 1 = KG 2 = Other (specify)	Unit price (Birr)	Total value sold (Birr)
M10.17	Sinar				
M10.18	Vetch				
M10.19	Pigeon pea				
M10.20	Other (specify)				
M10.21	Do you have seed/seedling nursery?			1 = Yes, 2 = No	
M10.22	What types of improved forages do you grow in your seed/seedling nursery? <u>[MULTIPLE RESPONSE]</u> <u>[DO NOT READ OUT OPTIONS]</u>			1 = Elephant grass 2 = Sesbania 3 = Rhodes grass 4 = Alfalfa 5 = Vetch 6 = Sinar 7 = Pigeon pea 8 = Lablab 9 = Cowpea 10 = Desho 11 = Buffle grass 12 = Guatemala grass 13 = Other (specify)	

Household members' participation [mostly] in forage production tasks [Circle all that apply]/Tick on [1]				
	Tasks	Adult male	Adult female	Children under 18
M10.23	Land preparation/planting	1	1	1
M10.24	Weeding	1	1	1
M10.25	Cultivation/hoeing	1	1	1
M10.26	Fertilizer application	1	1	1
M10.27	Watering	1	1	1
M10.28	Cutting or harvest	1	1	1
M10.29	Other (specify)	1	1	1

Challenges in forage production [Circle all that apply]/Tick on [1]		
	Challenges	Responses
M10.30	Shortage of improved forage seed/cutting	1
M10.31	Shortage of land	1
M10.32	No digestibility of the forage	1
M10.33	Pest/disease	1
M10.34	Lack of water for irrigation	1
M10.35	Lack of awareness on the usage	1
M10.36	High seed price	1
M10.37	Lack of knowledge on forage production	1
M10.38	Other (specify)	1

MODULE 11: FORAGE PRODUCTION VALUE CHAIN

S.No.	Question(s)	Code Description
M11.1	Did your household purchase forage inputs in the last 12 months?	1 = Yes, 2 = No [Skip to Module 12, if "No," to question # M11.1]
M11.2	Who decided on the forage purchase?	1 = Women only 2 = Men only 3 = Jointly (both) 4 = Other (specify)_____

	Type of seed/seedling purchased/used during the last 12 months	Total quantity purchased during the last 12 months	Unit 1 = KG 2 = Number 3 = Other (specify)	Average unit price in Birr	Total value purchased in Birr	Source of feed 1 = Co-op/Union enterprise 2 = Own production 3 = Private enterprise 4 = Government 5 = Other farmers 6 = ACDI/VOCA 7 = Other NGOs 7 = Other (specify)
M11.3	Seed					
M11.4	Seedling					
M11.5	Cuttings					
M11.6	Splits					
M11.7	Other (specify)					

S.No.	Question(s)	Code Description
M11.8	How long does it take to reach a forage planting material (seed, seedlings, cuttings, splits, etc.) sales/distribution point from your farm? (average walking distance in minutes for a single trip)	_____
M11.9	Do you think that these distribution outlets are enough?	1 = Yes, 2 = No
M11.10	If no for question # M11.9 , what are the reasons? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = It serves too many farmers 2 = The service is too far/not accessible 3 = Unbalanced supply and demand 4 = Other (specify)
M11.11	Have you ever accessed forage market information in the last 12 months?	1 = Yes 2 = No (skip to question # M11.14 if “No”)
M11.12	If yes for question # M11.11 , what was your source of information? [circle all that apply] [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = Local traders/forage suppliers 2 = Cooperative/Union 3 = Development Agents 4 = Fellow farmers 5 = Community meeting 6 = Other (specify) _____
M11.13	How did you receive the forage market information in your locality? [MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	1 = Text message 2 = Mobile call 3 = Farmer-to-farmer communication 4 = Community meeting 5 = In-person/face-to-face 6 = Other (specify) _____
M11.14	Was the forage adequate to properly keep your livestock?	1 = Yes, 2 = No [Skip to question # M12.1/household dietary diversity, if “Yes,” to question # M11.14]
M11.15	If no for question # M11.14 , what was the problem?	1 = High input price 2 = Low input quality

	[MULTIPLE RESPONSE] [DO NOT READ OUT OPTIONS]	3 = Limited input supply 4 = Skill and knowledge gap 5 = Other (specify) _____
M11.16	What were the alternatives that you applied to overcome the challenges?	1 = Reduce the quantity given to livestock 2 = Started own production 3 = Borrowed from neighbors 4 = Brought inputs from other areas 5 = Other (specify) _____
M11.17	What do you think are the possible consequences of the limited access forage production?	1 = Reduced quality of livestock production 2 = Reduced quantity of livestock production 3 = Reduced income from livestock 4 = Associated health effects 5 = Other (specify) _____

MODULE 12: HOUSEHOLD DIETARY DIVERSITY

Now I would like to ask you about the types of foods that you or anyone else in your household ate since this time yesterday. Since this time yesterday, have you or anyone else in your household eaten/taken any of the following things to eat or drink?

If the previous day was a fasting day, ask them about the day before (or the last non-fasting day).

READ THE LIST OF FOODS. PLACE/CIRCLE ONE IN THE SPACE PROVIDED IF ANYONE IN THE HOUSEHOLD ATE THE FOOD IN QUESTION. PLACE/CIRCLE TWO IN THE SPACE PROVIDED IF NO ONE IN THE HOUSEHOLD ATE THE FOOD.

S.No.	Question(s)	Code Description
M12.1	Any beef, pork, lamb, goat, chicken, or other birds, liver, kidney, heart, or other organ meats?	1 = Yes, 2 = No
M12.2	Any eggs?	1 = Yes, 2 = No
M12.3	Any foods made from beans, peas, lentils, or nuts?	1 = Yes, 2 = No
M12.4	Any cheese, yogurt, milk, or other milk products?	1 = Yes, 2 = No
M12.5	Any foods made with oil, fat, or butter?	1 = Yes, 2 = No
M12.6	When you are not fasting, how often do you eat at least one of the following foods (meat, fish, egg, dairy, yogurt, butter, etc.)?	1 = Daily 2 = More than once per week 3 = Once per week 4 = Other (specify) _____

D2 Primary Cooperatives Questionnaire
[APPLICABLE ONLY FOR BENEFICIARY HHs]

SECTION A: AREA IDENTIFICATION

Region	Zone	Woreda	Kebele	Cooperative name	Type of Co-op 1 = Multi-purpose 2 = Livestock	If it is livestock cooperative 1 = Dairy 2 = Fattening 3 = Both

SECTION B: BASIC INFORMATION OF COOPERATIVE

S. No	Questions	(Put the answer code in front of the question)
1.	How many individual members does this cooperative have? 1A. Male _____ 1B. Female _____ 1C. Total _____	
2.	How many years has it been since this cooperative was established?	
3.	What is the maximum share paid per member (in Birr)?	
4.	What is the minimum share owned per member (in Birr)?	
5.	What is the net capital of the cooperative (in Birr)?	

6.	<p>Which services does the cooperative provide for its members?</p> <table border="1"> <thead> <tr> <th data-bbox="293 233 802 342">Service Types</th> <th data-bbox="802 233 1174 342">1 = Yes, 2 = No (put the answer code in front of the question)</th> </tr> </thead> <tbody> <tr> <td data-bbox="293 342 802 426">6A = Commodities marketing</td> <td data-bbox="802 342 1174 426"></td> </tr> <tr> <td data-bbox="293 426 802 510">6B = Agricultural input supply</td> <td data-bbox="802 426 1174 510"></td> </tr> <tr> <td data-bbox="293 510 802 594">6C = Processing/milk</td> <td data-bbox="802 510 1174 594"></td> </tr> <tr> <td data-bbox="293 594 802 678">6D = Credit Supply</td> <td data-bbox="802 594 1174 678"></td> </tr> <tr> <td data-bbox="293 678 802 762">6E = Livestock feed supply</td> <td data-bbox="802 678 1174 762"></td> </tr> <tr> <td colspan="2" data-bbox="293 762 1174 804">6F = Other (specify) _____</td> </tr> </tbody> </table>	Service Types	1 = Yes, 2 = No (put the answer code in front of the question)	6A = Commodities marketing		6B = Agricultural input supply		6C = Processing/milk		6D = Credit Supply		6E = Livestock feed supply		6F = Other (specify) _____		
Service Types	1 = Yes, 2 = No (put the answer code in front of the question)															
6A = Commodities marketing																
6B = Agricultural input supply																
6C = Processing/milk																
6D = Credit Supply																
6E = Livestock feed supply																
6F = Other (specify) _____																
7.	<p>Has the cooperative been provided with any support (technical, material, or financial)?</p> <p>1. Yes</p> <p>2. No</p>															
8.	<p>If yes for question #7, please specify the type of support provided:</p> <p>1 = Technical support</p> <p>2 = Livestock feeds</p> <p>3 = Livestock forage seeds</p> <p>4 = Other material support</p> <p>5 = Financial support</p> <p>6 = Credit facility</p> <p>7 = Market linkage</p> <p>8 = Other (specify) _____</p>															
9.	<p>If yes for question #7, please specify the organizations which provided the support [multiple response]:</p> <p>1 = Government</p> <p>2 = ACDI/VOCA</p> <p>3 = Other NGOs</p> <p>4 = Private banks</p> <p>5 = Micro-finance institutions</p> <p>6 = Other (specify) _____</p>															

10.	<p>If the cooperative is engaged in milk processing, indicate the last 3 years' performance.</p> <table border="1"> <thead> <tr> <th>The last 12 months' milk and milk products</th> <th>2018</th> <th>2019</th> <th>2020</th> </tr> </thead> <tbody> <tr> <td>Raw milk collected (liters)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Processed milk (liters)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Butter (kg)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Cheese (kg)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Yogurt</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Cream</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	The last 12 months' milk and milk products	2018	2019	2020	Raw milk collected (liters)				Processed milk (liters)				Butter (kg)				Cheese (kg)				Yogurt				Cream								
The last 12 months' milk and milk products	2018	2019	2020																															
Raw milk collected (liters)																																		
Processed milk (liters)																																		
Butter (kg)																																		
Cheese (kg)																																		
Yogurt																																		
Cream																																		
11.	<p>If the cooperative provides/supplies livestock feed for members for question # (6E=1), how many in average (quintal/annum) did it supply over the last 3 years?</p> <table border="1"> <thead> <tr> <th>Feed type</th> <th>2018</th> <th>2019</th> <th>2020</th> </tr> </thead> <tbody> <tr> <td>11A = Dairy manufactured feed</td> <td></td> <td></td> <td></td> </tr> <tr> <td>11B = Fattening manufactured feed</td> <td></td> <td></td> <td></td> </tr> <tr> <td>11C = Poultry manufactured feed</td> <td></td> <td></td> <td></td> </tr> <tr> <td>11D = Hay</td> <td></td> <td></td> <td></td> </tr> <tr> <td>11E = Improved forage seed</td> <td></td> <td></td> <td></td> </tr> <tr> <td>11F = Feed ingredients</td> <td></td> <td></td> <td></td> </tr> <tr> <td>11G = Other (specify)</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Feed type	2018	2019	2020	11A = Dairy manufactured feed				11B = Fattening manufactured feed				11C = Poultry manufactured feed				11D = Hay				11E = Improved forage seed				11F = Feed ingredients				11G = Other (specify)				
Feed type	2018	2019	2020																															
11A = Dairy manufactured feed																																		
11B = Fattening manufactured feed																																		
11C = Poultry manufactured feed																																		
11D = Hay																																		
11E = Improved forage seed																																		
11F = Feed ingredients																																		
11G = Other (specify)																																		
12.	<p>If the cooperative provides improved forage seed to its members for question # (11E), which of the following is the main source?</p> <p>1 = Government 2 = ACDI/VOCA 3 = Other NGOs 4 = Union feed manufacturing units 5 = Commercial feed manufacturers 5 = Private vendors (retailers) 6 = Wholesalers 7 = Primary cooperatives 8 = Other (specify)</p>																																	
13.	<p>Name of the union feed manufacturing units selling animal feed to the unions:</p> <p>_____</p> <p>_____</p>																																	
14.	<p>Name of the commercial feed manufacturers selling animal feed to the unions:</p> <p>_____</p> <p>_____</p>																																	

15.	Name of the wholesalers selling animal feed to the unions: _____ _____ _____	
16.	Name of the private vendors (retailers) selling animal feed to the unions: _____ _____	
17.	What are the reasons the cooperative is purchasing the commercial feed from the specified sources? 1 = Proximity to the cooperatives 2 = Low price 3 = Product quality 4 = Other (specify)	
18.	What is the average distance of the union feed manufacturing units from the cooperatives in km or in hours? _____	
19.	What is the average distance of the commercial feed manufacturers from the cooperatives in km or in hours? _____	
20.	What is the average distance of the wholesalers from the cooperatives in km or in hours? _____	
21.	What is the average distance of the private vendors (retailers) from the cooperatives in km or in hours? _____	
22.	If the cooperative is purchasing commercial feed from the private vendors, where did the private vendor purchase the commercial feed from? 1 = Union feed manufacturing units 2 = Commercial feed manufacturers 3 = Wholesalers 4 = Other (specify)	
23.	Who are the usual customers/buyers of commercial feed? 1 = Small holder farmers 2 = Commercial farmers 3 = Retailers 4 = Other (specify) _____	
24.	What is the total volume of sale during the past 12 months (classify by customer types like smallholder farmers, retailers, etc.)? 1 = Smallholder farmers: _____ 2 = Commercial farmers: _____ 3 = Retailers: _____ 4 = Others: _____	
25.	What is the total value of sale during the past 12 months (classify by customer types like smallholder farmers, retailers, etc.)? 1 = Smallholder farmers: _____	

	2 = Commercial farmers: _____ 3 = Retailers: _____ 4 = Others: _____													
26.	If the cooperative provides/supplies livestock feed for its members (6E=1), what was its annual gross revenue in the last year from livestock feed?													
27.	If the cooperative does not supply feed, what are the main reason(s)? <table border="1"> <thead> <tr> <th>Reasons for not supplying feed</th><th>1 = Yes, 2 = No</th></tr> </thead> <tbody> <tr> <td>27A = Shortage of suppliers</td><td></td></tr> <tr> <td>27B = No/limited member demand</td><td></td></tr> <tr> <td>27C = Lack of knowledge regarding the importance of commercial feed</td><td></td></tr> <tr> <td>27D = Shortage of capital/resource</td><td></td></tr> <tr> <td>27E = Other (specify) _____</td><td></td></tr> </tbody> </table>	Reasons for not supplying feed	1 = Yes, 2 = No	27A = Shortage of suppliers		27B = No/limited member demand		27C = Lack of knowledge regarding the importance of commercial feed		27D = Shortage of capital/resource		27E = Other (specify) _____		
Reasons for not supplying feed	1 = Yes, 2 = No													
27A = Shortage of suppliers														
27B = No/limited member demand														
27C = Lack of knowledge regarding the importance of commercial feed														
27D = Shortage of capital/resource														
27E = Other (specify) _____														
28.	Does the cooperative prepare an annual business plan? 1 = Yes, 2 = No													
29.	Does the cooperative practice the financial documents? 1 = Practice Peachtree accounting 2 = Recordkeeping like ledger, register books 3 = Other (specify)													
30.	Does the cooperative run a dairy farm? 1 = Yes, 2 = No													
31.	If yes for question #30 , what was the annual gross revenue (Birr) from dairy production during the past 12 months?													
32.	Does the cooperative fatten livestock? 1 = Yes, 2 = No													
33.	If yes for question #32 , what was the annual gross revenue (Birr) from the fattening operation during the last 12 months?													

34.	What resources/infrastructure does the cooperative own for running its feed/livestock related enterprise? <table border="1"> <tr> <th>Resources/Infrastructure type</th> <th>1 = Yes, 2 = No</th> </tr> <tr> <td>34A = Land</td> <td></td> </tr> <tr> <td>34B = Warehouse</td> <td></td> </tr> <tr> <td>34C = Working capital</td> <td></td> </tr> <tr> <td>34D = Vehicle</td> <td></td> </tr> <tr> <td>34E = Other (specify) _____</td> <td></td> </tr> </table>			Resources/Infrastructure type	1 = Yes, 2 = No	34A = Land		34B = Warehouse		34C = Working capital		34D = Vehicle		34E = Other (specify) _____						
Resources/Infrastructure type	1 = Yes, 2 = No																			
34A = Land																				
34B = Warehouse																				
34C = Working capital																				
34D = Vehicle																				
34E = Other (specify) _____																				
35.	<table border="1"> <tr> <th>Financial status of the cooperative</th> <th>2018</th> <th>2019</th> <th>2020</th> </tr> <tr> <td>Total annual gross revenue of the cooperative of the year (Birr)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total annual sales from all operations in the year (Birr)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total annual sales from milk and milk products in the year (Birr)</td> <td></td> <td></td> <td></td> </tr> </table>			Financial status of the cooperative	2018	2019	2020	Total annual gross revenue of the cooperative of the year (Birr)				Total annual sales from all operations in the year (Birr)				Total annual sales from milk and milk products in the year (Birr)				
Financial status of the cooperative	2018	2019	2020																	
Total annual gross revenue of the cooperative of the year (Birr)																				
Total annual sales from all operations in the year (Birr)																				
Total annual sales from milk and milk products in the year (Birr)																				
36.	What was the maximum annual dividend paid per member (Birr) in the last payment?																			
37.	What was the minimum annual dividend paid per member (Birr) in the last payment?																			
38.	What was the annual net profit of the cooperative (Birr) after dividend payment?																			
39.	Are you an agent for big concentrate feed companies or do you retail their products? 1 = Yes, 2 = No																			
40.	If yes, what are the names of the companies?																			
41.	If yes for question #39, what type of products?																			
42.	What are the buying prices for the product?																			
43.	What are the selling prices for the product?																			

D3 Key Informant Interview Tool

D3a: Key Informant Interview (KII) Guide for ACDI/VOCA

Name of respondent: _____

Position in the project: _____

Office location (HQ, project site): _____

Mobile phone: _____

1. Strategies and Approaches

- What strategies and approaches were adopted to implement the project?
- Why did you select these strategies?
- Do you think these strategies and approaches worked well, as expected?
- What challenges did you face in strategy selected and implementation?
- What lessons did you learn from selection of strategies?

2. Project Relevance

- What efforts did you make to make the project relevant to community interests?
- How have you been addressing the interests of private institutes?
- Was a government body involved in project planning and validation to ensure that activities and outputs are in line with government development priorities?

3. Beneficiary Targeting

- Who were your targets in the implementation of the project?
- Which groups of community?
- How did you incorporate gender consideration in targeted community selections?
- Which governmental institutions did you target?
- Which non-governmental institutions?
- How did you select these beneficiaries?
- Why did you focus on these targets?

4. Project Effectiveness

- To what extent has the FEED III project achieved its intended outputs, outcomes, and impacts?

▪ Extent of effectiveness of **increased production and productivity**

Planned activities/outputs	Planned targets (# planned)	Achievements (# achieved)	Reasons for discrepancy

▪ Extent of effectiveness of **increased leverage of private sector resources**

Planned activities/outputs	Planned targets (# planned)	Achievements (# achieved)	Reasons for discrepancy

--	--	--	--

- Extent of effectiveness of **increased capacity of key groups in the agricultural production sector (co-ops and smallholder farmers)**

Planned activities/outputs	Planned targets (# planned)	Achievements (# achieved)	Reasons for discrepancy

- Extent of effectiveness of **increased use of improved agricultural techniques and technologies**

Planned activities/outputs	Planned targets (# planned)	Achievements (# achieved)	Reasons for discrepancy

- Extent of effectiveness of **increased use of financial services**

Planned activities/outputs	Planned targets (# planned)	Achievements (# achieved)	Reasons for discrepancy

- Extent of effectiveness of **improved farm management (operations, financial)**

Planned activities/outputs	Planned targets (# planned)	Achievements (# achieved)	Reasons for discrepancy

- Extent of effectiveness of **expanded trade of agricultural products (domestic, regional, and international)**

Planned activities/outputs	Planned targets (# planned)	Achievements (# achieved)	Reasons for discrepancy

- Extent of effectiveness of **developing feed ingredient supply chain and service sector**

Planned activities/outputs	Planned targets (# planned)	Achievements (# achieved)	Reasons for discrepancy

- Extent of effectiveness of **building the capacity and growth of feed sector enterprises**

Planned activities/outputs	Planned targets (# planned)	Achievements (# achieved)	Reasons for discrepancy

- Extent of effectiveness of **developing sustainable forage production systems**

Planned activities/outputs	Planned targets (# planned)	Achievements (# achieved)	Reasons for discrepancy

- Extent of effectiveness of **expanding dairy, fattening, and poultry enterprises**

Planned activities/outputs	Planned targets (# planned)	Achievements (# achieved)	Reasons for discrepancy

- Extent of effectiveness of **promoting improved on-farm feeding practices**

Planned activities/outputs	Planned targets (# planned)	Achievements (# achieved)	Reasons for discrepancy

- What are the factors that have largely contributed to project achievements?
- What is the way forward set in place for activities which have not been achieved as planned?

5. Efficiency of the FEED III project

- **Efficiency in budget utilization**
 - What is the total budget of the project?
 - What was the total budget released?

- What proportion has been utilized?

Budget utilization summary	ETB	USD	Remark
Total project budget allocated			
Budget released			
Budget utilized			
Out of project fund utilized			
Total program cost			
Total admin cost			

- **Budget utilization status by project components**

- ✓ Which of the project components was more efficient in budget utilization?

Budget utilization efficiency by project components

Project component	Allocated budget (USD)		Utilized budget (USD)	
	ETB	USD	ETB	USD
Agricultural productivity				
Leveraging of private sector resources				
Policy and regulatory framework				
Capacity building of key groups in the agricultural production sector				
Use of improved agricultural techniques and technologies				
Supports of financial resources				
Enhancing farm management practices				
Supports in expanding trade of agricultural practices				

- **Efficiency in the extent to which the cost of the project has been justified by the benefits of the project components; The common question to all the following components will be:** To what extent are the short-term and long-term benefits of the outcomes and impacts of this component justified compared to the resources utilized?
 - Efficiency of increased agricultural productivity component
 - Efficiency of increased leverage of private sector resources
 - Efficiency of policy and regulatory framework
 - Efficiency of capacity of key groups in the agricultural production sector (co-ops and smallholder farmers)
 - Efficiency in increased use of improved agricultural techniques and technologies
 - Efficiency in increased use of financial services
 - Efficiency in improved farm management (operations, financial)
 - Efficiency in expanded trade of agricultural products (domestic, regional, international)
 - Efficiency in capacity building of community beneficiaries, enterprises, and stakeholders
 - Efficiency in availing project inputs on time, quality, and quantity

- Efficiency in the day-to-day project management

6. External Relationships and Partnerships of the FEED III Project

- Partners of FEED III project
- Modes and challenges of partnerships

7. Outcomes and Impacts of the FEED III Project

Note: Baseline figures are essential here if there are some. In this chapter, efforts will be made to illustrate case analysis witnessing success stories in each of the following components, along with pictures:

- Outcomes and impacts of increased agricultural productivity component
- Outcomes and impacts of increased leverage of private sector resources
- Outcomes and impacts of policy and regulatory framework
- Outcomes and impacts of capacity of key groups in the agricultural production sector (co-ops and smallholder farmers)
- Outcomes and impacts in increased use of improved agricultural techniques and technologies
- Outcomes and impacts in increased use of financial services
- Outcomes and impacts in improved farm management (operations, financial)
- Outcomes and impacts in expanded trade of agricultural products (domestic, regional, international)

8. Best Practices and Lessons Learned

- What are the best practices of the FEED III project that can be scaled up and out?
- What lessons can be learned during project deliberations (from beginning to end)?

9. Prospects of Sustainability of FEED III Project Outcomes and Impacts

- What is the extent of sustainability for each of the following project components?
 - Enhanced agricultural productivity
 - Leveraged private sector resources
 - Adopted improved agricultural technologies
 - Strengthened financial services
 - Capacitated farm management practices
 - Expanded trade of agricultural products

10. Program Management

- How is the personnel of the FEED III project (this sub-chapter will address the staff profiles engaged in the implementation of the FEED III project)?

Staff profile of FEED III project

Position	Education	Technical experiences (years)	
		Within the project	Outside the project

- **Project coordination and documentation**
 - To what extent were project coordinators effective, flexible, and supportive to their staff during implementation?
 - How was the status of documentation of project plans, progresses, and achievements?
- **Project planning, monitoring, and evaluation**
 - What are the approaches used in annual project planning?
 - Who has been participating in annual project planning?
 - How was flexibility of annual and quarterly plans in response to emerging circumstances?
 - What are the M&E mechanisms adopted in the FEED III project?
 - Was the M&E exercise following standard procedures?
 - Is there an M&E plan for the FEED III project?
 - How was the supportiveness of HQ ACDI/VOCA project management to field level staff?

11. Key Roles and Contributions of ACDI/VOCA and USDA in FEED III Project Implementation

- What are the key roles of ACDI/VOCA in the overall project design and implementation?
- What are the contributions of USDA in the FEED III project?

12. Challenges Faced

- What challenges did the FEED III project face during implementation from beginning to end?
- To what extent have these challenges affected project outputs?
- What are the response strategies and measures taken to address the challenges?

13. Gaps of FEED III Project

- What are the inherent gaps of the FEED III project?
- What should have been done by the FEED III project?
- What should not have been done by the FEED III project?

14. Any issue you (ACDI/VOCA) would like to describe related to the project which has not yet been captured in this checklist?

D3b: Key Informant Interview (KII) Guides for Stakeholders

Region: _____

Zone: _____

Woreda: _____

Name of respondent: _____

Position of respondent: _____

Institution: _____

Mobile phone: _____

Guiding Questions:

1. Awareness About Project Details

- Are you a signatory of the FEED III project?
- To what extent are you aware of FEED III project goals and details?
- Have you ever participated in project inauguration and planning meetings?
- Have you ever participated in project validation or other workshops where progresses and achievements have been presented?

2. Issue of Relevance

- Do you think project objectives are in line with government development priorities?
- Do you think project objectives are in line with beneficiary interests?
- What is your reflection on project relevance?
- What is your extent of satisfaction on project relevance (highly unsatisfied, satisfied, medium, satisfied, highly satisfied)?

3. Targeting

- Whom do you think are project targets or beneficiaries (community members, institutes, private enterprises, etc.)?
- How do you think these beneficiaries were selected?
- Do you think project targeting was transparent?
- Do you believe project targets were appropriately selected?
- What is your reflection project targeting?
- What is your extent of satisfaction on project targeting (highly unsatisfied, satisfied, medium, satisfied, highly satisfied)?

4. Participation

- Have you ever participated in project design, validation, and implementation?
- How frequently have you been participating?
- What did you learn from participation?
- Do you have any formal agreement with the FEED III project (such as for implementation, cost sharing, etc.)?

5. Issue of Effectiveness

- What do you think are the project's achievements?
- Have you ever participated and contributed to the project's implementation?
- Do you think the project has achieved its objectives or goals?

- What is your reflection on implementation of the FEED III project?
- How participatory was project implementation?
- Have you ever received project quarterly and annual reports?
- What is your extent of satisfaction on project effectiveness (highly unsatisfied, satisfied, medium, satisfied, highly satisfied)?

6. Project Efficiency

- Are you aware of the FEED III project budget and resources?
- How transparent is the FEED III project in resource utilization?
- Was there cost sharing arrangement (have you ever contributed to the project through cost sharing mechanisms)?
- What is your reflection from resources utilized compared to what has been done (resources spent vs. outcomes/impacts achieved)?
- Have you ever received reports on financial utilization?
- What is your extent of satisfaction on project efficiency (highly unsatisfied, satisfied, medium, satisfied, highly satisfied)?

7. Cross-Cutting Issues

- To what extent do you think the project has been addressing gender?
- Were women (married and female household heads) and youths addressed by the project?
- Do you think the project has also been addressing issues related to the environment?

8. Project Outcomes and Impacts

- What outcomes and impacts did you witness from FEED III project implementation?
- Do you think project beneficiaries have brought changes in their livelihoods or economic status or food security because of the project?
- What do you think has contributed to this outcome?
- What is your extent of satisfaction on project outcomes and impacts (highly unsatisfied, satisfied, medium, satisfied, highly satisfied)?

9. Sustainability

- Does the project have an exit strategy?
- Which institute do you think will overtake the initiatives if the project is going to phase out?
- Do you think the project outcomes/impacts would remain sustainable, how, and why?
- What do you think should be done to reinforce sustainability of project achievements?
- To what extent are you satisfied with the exit strategy of the project (highly unsatisfied, satisfied, medium, satisfied, highly satisfied)?

10. Lessons Learned

- What lessons do you think can be drawn from the overall project implementation? Such as from project:
 - Planning
 - Transparency
 - Targeting
 - Implementation
 - Resource utilization

- Reporting and documentation
- Exit strategy and sustainability

D3c: Key Informant Interview (KII) Guides for Smallholder Farmers

1. Types of Interventions Received/Hosted

- What types of interventions did you receive from the FEED III project?
- Who provided you these interventions?
- When did you start hosting the interventions?
- To what extent are you satisfied with the types of interventions made?

	Highly satisfied	Satisfied (medium)	Not satisfied
Extent of satisfaction from types of interventions			

2. Relevance of Interventions

- Were the interventions based on your interests?
- Which interventions do you think are better than others, and why?
- How are the FEED III interventions different from interventions made by MOA, research institutes, universities, and other development partners?
- Were the interventions helpful in addressing feed problems?
- Which of the project components did you host?
 - Dairy
 - Fattening
 - Poultry
- Why and how were one or more of these project interventions selected for you?
- To what extent are you satisfied with the relevance of interventions made?

	Highly satisfied	Satisfied (medium)	Not satisfied
Extent of satisfaction from relevance of interventions			

3. Selection of Target Beneficiaries (Targeting)

- How was selection of project beneficiaries made?
- How were you selected for this project?
- Do you think all the beneficiaries were selected appropriately?
- What do you suggest should have been done to make selection appropriate?
- To what extent are you satisfied with the targeting of beneficiaries?

	Highly satisfied	Satisfied (medium)	Not satisfied
Extent of satisfaction on targeting made			

4. Performances of Project Interventions

- Do you think project components were implemented in a timely manner with the required quality?

- Which of the project activities were implemented properly and which ones not, and what are the reasons why?
- What was your role and contribution in implementation of the component you hosted?
- How was the input availability, quality, and price?
- What types of inputs did you utilize?
- Who purchased these inputs and adequacy?
- To what extent are you satisfied with the performance of the project?

	Highly satisfied	Satisfied (medium)	Not satisfied
Extent of satisfaction on project performance			

5. Trainings Received Related to the Project Component You Hosted

- What trainings did you receive from the FEED III project in the last three years?
- What types of trainings did you receive related to animal feeds?
- How was the usefulness of these trainings in improving feed availability and quality?
- Please explain the nature of the trainings with respect to the following issues:
 - If the training was need-based
 - Relevance of trainings
 - Adequacy of trainings
 - Quality of trainings
- Who were targeted for the trainings, and was that targeting correct?
- Who provided the trainings? How good were these trainers in terms of language and supportiveness during the training?
- Was there availability of reading materials in local languages?
- Did trainers follow-up after the training and provide supportive supervision?
- Were the trainings provided during the appropriate time of season?
- Among the topics covered in trainings, which ones were most relevant and helpful? Why?
- Which topics were not relevant? Why?
- Was there practical demonstration?
- Was there experience sharing from model farms/farmers?
- What is your overall level of satisfactions on trainings received?
- What are the training gaps?
- What should be improved in the future?
- To what extent are you satisfied with the trainings provided?

	Highly satisfied	Satisfied (medium)	Not satisfied
Relevance of trainings			
Adequacy of trainings			
Timeliness of trainings			
Quality of trainings			

6. Feed Resources

- How is feed availability in the locality after the training?
- What are the sources of feeds?

- How is the availability of feed processing companies in the locality (their capacity, ability to supply adequate feeds, their feed prices, seasonality of feed supply, quality of their feed)?
- What types of feeds are available (for dairy animals, fattening animals, poultry, sheep, and goats)?
- How is the quality of feeds?
- What are the price trends of feeds before and during the project?

7. Adoption of New Feed-Related Technologies

- What new technologies did you receive from the project?
- How helpful were these technologies?
- Were these technologies based on your interests?
- Did you receive trainings on how to apply and use these technologies?
- Out of the beneficiaries who received the technologies, how many of them do you think are still using (adopted)?

	All of the farmers adopted	Many of the farmers adopted	Some of the farmers adopted	No one at all adopted
Extent of technology adoption				

- For those farmers who did not at all adopt, what are the reasons?
- Out of these technologies, which ones are good and which are not? Why?
- Out of the technologies you received, which ones are you still using, and which have you stopped using (please use the following table)?

Project components	Specific technologies you received	Which you are still using (adopted)	What are the merits of the technologies	Which did you stop using (rejected)	What are the weaknesses of the technologies
Dairy	• • •	• • •	• • •	• • •	• • •
Fattening	• •	• •	• •	• •	• •
Poultry	• •	• •	• •	• •	• •
Others (if any)	• •	• •	• •	• •	• •

- How is the size of farmland allocation status to the technologies compared to the size before the project?

Type of technology adopted	Area of land allocated before the project (ha)	Area of land allocated after the project (ha)
----------------------------	--	---

- Was there adequate promotion and demonstration of the technologies?
- Have you ever received a loan from the project?
- For what purposes did you use the loan?
- Was the loan helpful to use (adopt) the technologies?
- Do you keep records of improved technologies on various aspects, such as:
 - Types and quantities of inputs used?
 - Quantities of outputs produced and sold?
 - Market prices and trends over time?
 - Other farm management particulars?
- What do you suggest in the future regarding technology introduction?
- How is profitability of the new technologies ?

Technology type	Income per unit before the project	Income per unit after the project
Dairy technologies • •		
Fattening technologies • •		
Poultry technologies • •		

8. Marketing Participation and Business Orientation of Smallholder Farmers

- How is marketing of dairy products, fattened animals, and poultry after the project compared to before the project?
- How is the price trend of products from adopted technologies?
- How is market participation and business orientation of the farmers now compared to before the project?
- Where and how do the farmers get market information?

9. Stakeholder Participation in Project Implementation

- Who supported you in FEED III project implementation other than ACIDI/VOCA?
- What did these stakeholders support?
- How helpful was their support?
- What should have been done by these stakeholders?
- What should not have been done by these stakeholders?
- Was there coordination among the stakeholders?
- To what extent are you satisfied with the performances of other stakeholders?

	Highly satisfied	Satisfied (medium)	Not satisfied
--	------------------	--------------------	---------------

Supportiveness of stakeholders			
Coordination of stakeholders			
Timeliness of stakeholder supports			
Follow-ups made by stakeholders			

10. Effects of COVID-19 on Performance of Project Activities

- What effects did COVID-19 impose on performance of the project?
- Which of the project interventions do you think were most affected by COVID-19?
- Which of the project beneficiaries are especially affected by COVID-19? Why?
- Which of the project beneficiaries were not affected by COVID-19? Why?
- What do you think should be done in the future to minimize the effects of COVID-19?

11. Outcomes and Impacts of FEED III Project Interventions

- Did the interventions address animal feed problems?
- How do you describe the extent of improvement of feed intervention since the project?

Change factors	Status before the project	Status after the project
	1. The problem was not very high 2. The problem was manageable (medium) 3. The problem was very high	1. It has improved a lot 2. It has improved a bit 3. No change 4. It became worse
Feed availability		
Feed quality		
Feed price		
Feed accessibility (Were households able to purchase feeds whenever and in whatever quantity they wanted?)		

- Did the interventions bring any change to your livelihoods?
- What changes did it bring to your livelihoods?
- What was the extent of changes brought up by the project?

Improvements observed by the family	Status before the project	Status after the project
	1. The problem was not very high 2. The problem was manageable (medium) 3. The problem was very high	1. It has improved a lot 2. It has improved a bit 3. No change 4. It became worse
Improvements in assets (more livestock owned)		
Improvements in housing conditions (rehabilitated existing house or built new house)		

Improvements in income		
Improvements in food security (adequate food availability throughout the year)		
Established new business for the family (new income sources)		
Improvements in overall livelihoods		
Other improvements		

- How satisfied are you with the overall interventions made by the project?

	Highly satisfied	Satisfied (medium)	No change	Not satisfied
Overall extent of satisfaction				

- What should have been done and what should not have been done?

Project actors	What they should have done instead	What they should not have done
ACDI/VOCA		
Other project stakeholders		
Community beneficiaries themselves		

- What are the unexpected positive benefits and negative changes brought up by the project (spillover effect)?

Unexpected positive benefits	Unexpected negative changes

12. Sustainability of Project Outcomes and Impacts

- Do you think the project interventions, outcomes, and impacts will remain sustainable if the project phases out?
- What are the reasons for your responses?
- What activities did the FEED III project do to ensure sustainability?
- What do you think should be done to increase sustainability?
- Which of the project components do you think will remain sustainable?

Project components	Will its outcomes and impacts remain sustainable? 1. Yes, 2. No, 3. Both yes and no	Which of the sub-components will continue to sustain?	Which of the sub-components will not sustain?	What are the reasons?
Dairy interventions				
Fattening interventions				

Poultry interventions				
-----------------------	--	--	--	--

13. Lessons Learned and Best Practices

- What do we learn from the project in general?
- What are the best practices of the project?
- Which of the best practices can be scaled up to others? Why?

Intervention categories	Best practices
Dairy interventions	•
Fattening interventions	•
Poultry interventions	•

14. Any other issues you would like to describe related to FEED III project?

D4: Focus Group Discussion (FGD) Interview Guides for Smallholder Farmers

Group Discussion Facilitation Protocol to Facilitators

Part I: Introduction/Warm-Up

1. Acknowledge participants for their willingness to take part in the FGD.
2. Explain the purpose of the group discussion.
3. Introduce yourself.
4. Explain the role of the facilitator and notetakers.
5. Let participants introduce themselves (list their name, sex, and other).

Part II: Instruction

1. Assure all participants personal data will be kept confidential and will not be used for unintended purpose (i.e., all the data provided will only be used for the study purpose).
2. Make clear what is expected of participants.
3. Make clear the time length of the discussion (between 45 to 60 minutes).
4. Keep eye contact with the participants and make sure the discussion is participatory for everyone.
5. Set ground rules for the group with the participants. Consider the following rules:
 - Respect for different views, no wrong answers, one person speaks at a time, everyone has the right to speak without being interrupted, raise your hands and get a signal from the facilitator before you talk, keep your answers short and precise to allow others to participate, switch off/silence your cellphones.
6. Do NOT promise what you cannot deliver.
7. Use a translator, whenever necessary.

Part III: Closing and Post-Discussion Activities

1. Summarize the ideas which emerged from the focus group, noting where there was consensus and where there was no consensus) on the themes of discussion.
2. Let participants add anything before you close.
3. Thank everyone for their time and input in the discussion.
4. Make sure to write the group discussion report immediately after the discussion.

List of FGD Participants

No.	Name	Remark
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Places	Name	Code	Time	Time/Date
Region				
Zone				
Woreda			Date of discussion	
Kebele			Start time (HH:MM)	
Facilitator name			End time (HH:MM)	
Notetaker name				

1. Types of Interventions Received/Hosted

- What are the types of technologies introduced?
- How were these technologies identified and selected?

2. Relevance of Interventions

- Was there a needs assessment to identify technologies?
- How helpful are the technologies?
- Out of the technologies introduced, which ones were relevant and which ones not?

3. Selection of Target Beneficiaries (Targeting)

- Who was involved in selection of beneficiaries?
- Were the selected beneficiaries appropriate and acceptable?
- How was involvement of women in the project?
- Which of the women farmers (married, female household heads) were involved?
- How was involvement of youths in the project?

4. Performances of Project Interventions

- Do you think all the project activities have been implemented as planned?
- Which of the project components were adequately implemented?
- Which of the project components suffered inadequate attention?
- How was the follow-up from the project implementers?
- Have the project managers and staff been supportive whenever problems arise?

5. Trainings Received Related to the Project Component You Hosted

- What types of trainings were offered by the project?
- Were the trainings based on beneficiary needs?

- Who received the trainings?
- How good and supportive were the trainers?
- How was the quality of the training?
- Were the trainings provided timely in relation to seasonality of activities?
- Was there post-training follow-up?
- What are the problems related to trainings provided?

6. Feed Resources Availability, Quality, and Price

- Have feed problems been addressed by the project?
- How is feed availability now compared to the situation before the project?
- How is feed quality now compared to the situation before the project?
- How is the price of feed now compared to the situation before the project?
- Is there still a problem now?
- What are these problems and why have they not been addressed during the project?

7. Adoption Status of New Feed-Related Technologies

- What technologies did you receive?
- Were these technologies based on your needs?
- To what extent have these technologies addressed the problems?
- Which of these technologies were preferred (adopted) by farmers?
 - What are the good features/merits of these technologies?
- Which of these technologies were not preferred (not adopted) by farmers?
 - What are the weaknesses of these technologies?
- What should be done in the future to introduce new technologies?
- How is the profitability of the new technologies adopted?

8. Stakeholder Participation in Project Implementation

- Apart from project staff, which stakeholders were involved in supporting beneficiaries?
- How helpful were these stakeholders?
- Was there coordination among these stakeholders?
- What should be done in the future regarding stakeholders?

9. Effect of COVID-19 on Performances of Project Activities

- What effects do COVID-19 impose on performances of the project?
- Which of the project interventions do you think were most affected by COVID-19?
- Which of the project beneficiaries are especially affected by COVID-19? Why?
- Which of the project beneficiaries were not affected by COVID-19? Why?
- What do you think should be done in the future to minimize the effects of COVID-19?

10. Outcomes and Impacts of FEED III Project Interventions

- What outcomes or impacts did beneficiaries bring as a result of the project?
- Were these outcomes/impacts helpful in improving livelihoods of beneficiaries?
- What factors have contributed to positive outcomes and impacts?
- What factors have impacted to negative outcomes and impacts?
- What are the unexpected positive benefits of project interventions?
- What are the unexpected negative problems created as a result of project interventions?

11. Sustainability of Project Outcomes and Impacts

- Who do you think will take over project initiatives after phase out of the project?
- Do you think project outcomes or impacts continue to be sustainable?
- Which of the project components do you think will remain sustainable?
- Which of the project components do you think will not continue?
- What activities did the project staff make to sustain project initiatives?

12. Lessons Learned and Best Practices

- What do we learn from the project in general?
- What are the best practices of the project?
- Which of the best practices can be scaled up to others? Why?

13. Any other issues you would like to describe about the project?

D5: Case Studies Guides

Region: _____

Zone: _____

Woreda: _____

Kebele: _____

Name: _____

Age: _____

Level of education: _____

Family size: _____

Farm size: _____

Type of intervention with which impact was brought up: _____

Key Probing Questions

1. When did you host the intervention?
2. How did you become a project beneficiary?
3. How did you select this technology?
4. How was the involvement of your wife and youths in managing this technology?
5. Which organizations helped you in managing the technology?
6. What impacts did you bring in your livelihoods?
7. Do you have other income sources?
8. Do you think these impacts will remain sustainable (how will you sustain)?
9. What is the main issue that made you bring these impacts?
10. What did you learn from using technologies?
11. How do your neighbors feel about your success?
12. Did other fellow farmers and neighbors visit your successful site?
13. What is your future plan?
14. What do you think are main reasons why most of the other project beneficiaries did not bring impacts like you do?
15. What do you advise to other fellow farmers?

16. Anything else you would like to share?

D6: Field Observation Checklist

Part 1. Background Information of the Observation Area

1. Region _____
2. Zone _____
3. Woreda _____
4. Kebele _____
5. Agro-ecological zone _____
6. Date and time of observation _____

Guidelines for observation: the following issues will be observed during terminal evaluation

Observation points	Status of the items at the time of observation (pictures will also be taken)
Farming type	
Topography	
Improved forage production sites	
Feed marketplaces	
Sources of feed and forage for livestock/poultry	
Infrastructural availability (electricity power source, water source, feed mill, feed mixer, warehouse, packing/trading)	
Improved feed processors and enterprises	
Technologies introduced and adopted by FEED III project interventions <ul style="list-style-type: none"> • • • • 	
Fattening sites and animals	
Poultry farms	
Dairy animals and farms	
Impacts brought by households, such as: <ul style="list-style-type: none"> • Improved housing • New assets created • Others 	