

# Feed Processing and Feed Formulation of Compound Feeds for sheep fattening in Ethiopia

A Training Report

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International Center for Agricultural Research in Dry Areas (ICARDA)



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Photo: Shaya women-only sheep fattening group, Bonga.

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## Overview

Under the CGIAR Initiatives, Sustainable Animal Productivity for Livelihoods, Nutrition, and Gender Inclusion (SAPLING) and Sustainable Intensification in Mixed Farming Systems (SI-MFS), a comprehensive training conducted on feed formulation and feed processing for sheep fattening in Ethiopia. The training targeted youth and women sheep fattening groups, aiming to enhance their knowledge and skills in optimizing feed management practices. ICARDA partnered with the National Agricultural Research Centers of Areka, Bonga, and Debre Berhan to deliver the training sessions. The objective of the trainings was to equip participants with the necessary expertise to formulate balanced sheep diets and efficiently process feed, thereby improving sheep productivity and promoting sustainable livestock feeding practices.

The trainings were conducted in Bonga, Doyogena, and Debre berhan between 15th March - 20 May 2023, engaging 175 participants. Training sessions were designed to be highly interactive, incorporating presentations, practical exercises, case studies, and group discussions to foster a collaborative learning environment.

Specific objectives of the training included equipping participants with the skills to formulate balanced sheep rations based on nutritional requirements, local feed resources, and cost-effectiveness. Participants were also trained in feed processing techniques, such as grinding, mixing, and pelleting, to ensure the production of high-quality feed with optimal nutrient distribution. The inclusion of women participants in each site highlighted the project's commitment to gender equality and women's empowerment in sheep fattening. Promotion of the use of locally available feed resources highlights commitment to sustainable practices.

## Training Objectives

The objectives of the three-day training were as follows:

- To understand the nutritional requirements of sheep.
- To learn the principles and techniques of feed formulation for sheep.
- To gain knowledge of different feed ingredients and their appropriate use in sheep diets.
- To acquire skills in feed processing methods such as grinding and mixing for improved feed quality and digestibility.
- To explore cost-effective and sustainable feed-resourcing strategies.

## Participants

The 175 training participants (105 male and 65 women) were from Bonga 75 youth (50 men, 25 women), Doyogena, 50 youths (30 men, 20 women) and Debre Berhan 50 youth (25 men,

25 women). The list of participants is attached as Annex II.

## Course Structure

### 1. Introduction to sheep fattening

- Overview of sheep fattening industry in Ethiopia.
- Importance of proper nutrition in sheep fattening.
- Factors influencing feed efficiency and profitability.

### 2. Nutritional requirements of sheep

- Essential nutrients for sheep and their functions.
- Understanding energy, protein, fiber, vitamins, and minerals requirements.
- Differentiating nutritional needs during different stages of sheep fattening.

### 3. Feed formulation

- Principles and techniques of feed formulation.
- Balancing rations for sheep using available feed ingredients.
- Evaluating feed quality and nutritional value.

### 4. Feed ingredients and their utilization:

- Common feed ingredients for sheep diets in Ethiopia.
- Nutritional composition and availability of locally sourced feed ingredients.
- Strategies for optimizing feed ingredient utilization and minimizing costs.

### 5. Feed processing techniques:

- Grinding and particle size reduction techniques for improved digestibility.
- Mixing and formulation of balanced sheep rations.
- Introduction to pelleting and other feed processing methods.

### 6. Practical demonstrations and Hands-on exercises:

- Practical sessions on feed formulation software and tools.
- Hands-on experience in feed processing techniques.
- Group discussions and case studies to apply the acquired knowledge.

## Course Implementation Approach

Pre-training preparations and logistics which included the availability of training resources, such as machine, feed ingredients, and feed processing equipment were organised by respective NARS centers.





Photo credit: Berhanu Bekele, Doyogena

## Training delivery

- Training began with an introductory session, welcoming participants and outlining the training objectives.
- Interactive sessions with presentations, demonstrations, and hands-on exercises were conducted.
- Encouragement of active participation and opportunities for group discussions and knowledge sharing created.
- Provision of practical demonstrations of feed formulation software, feed processing equipment, and techniques.
- Incorporation of case studies and real-life examples to illustrate concepts and challenges specific to Ethiopia.
- Allocation of sufficient time for questions and answers to address participants' queries and concerns.
- Monitoring of participants' progress and provide individual assistance as needed.

## Field visits and practical training

- Field visits were organized to sheep farms and feed processing facilities for practical exposure.
- Participants were allowed to observe feed processing operations and interact with experienced farmers or industry experts.

- Hands-on training sessions were facilitated whereby participants practiced feed formulation and feed processing techniques under supervision.



Photo credit: Berhanu Bekele, Doyogena

## Group Assessment

The group assessment aimed to promote collaborative learning, problem-solving skills and critical thinking. Group assessment sessions are outlined below:

### Feed formulation case study

Participants were divided into small groups and presented with a case study scenario involving a sheep farm in Ethiopia. Each group was tasked with formulating a balanced diet for a specific group of sheep based on their weight, age, and nutritional requirements. They



had to consider the availability of local feed ingredients, cost effectiveness and desired growth targets. The groups were required to work together, apply feed formulation principles, and use knowledge gained during the training to develop a comprehensive feeding plan. They were assessed based on the accuracy of their ration formulation, the appropriateness of ingredient selection, and the justification of their decisions.

### **Feed processing practical exercise**

Another group assessment activity focused on feed processing techniques. Participants were divided into teams and provided with different feed ingredients commonly used in sheep diets. Each group was assigned the task of processing the ingredients into a pelleted feed using the available feed processing equipment. Teams had to demonstrate their understanding of grinding, mixing, and pelleting techniques to produce a high-quality feed with appropriate particle size and uniform nutrient distribution. The assessment criteria included the effectiveness of the feed processing methods employed, the quality of the final product, and the groups' ability to troubleshoot and address any challenges encountered during the exercise.

### **Group presentation and discussion**

To assess the participants' comprehension and communication skills, each group was assigned a specific topic related to feed formulation or feed processing for sheep fattening. The groups were given time to research and prepare a presentation on their topic, highlighting key concepts, best practices, and potential challenges. They then had to give their presentations to the entire training cohort, followed by a group discussion where participants could ask questions and engage in a constructive dialogue. The assessment criteria included the clarity and depth of the presentations, the ability to effectively communicate complex ideas, and the groups' active participation in the subsequent discussion. These group assessments provided participants with the opportunity to apply their knowledge, collaborate with their peers, and showcase their understanding of feed formulation and feed processing for sheep fattening in Ethiopia. The assessments not only evaluated their individual and group performance but also fostered a supportive learning.

## Annex 1: Resource Persons

Name & Surname	Institution
Tesfa Getachew	Debre Brehan ARC, Researcher
Liulseged Alemayehu	Debre Brehan ARC, Researcher
Kibreab Yosef	Bonga ARC, Researcher
Tesfaye Abiso	Doyogena ARC, Researcher
Yohannis Getachew	John Farm - Private entrepreneur
Habtamu Araga	Livestock Officer, Bonga

## Annex 2: Publications Resources

Sheep fattening: A manual for livestock farmers and extension workers in the Ethiopia

<https://hdl.handle.net/20.500.11766/66962>

Tutorial video for smallholder farmers on feeds and feeding management for sheep fattening <https://hdl.handle.net/10568/127482>

Business Plan: Feed processing by youth groups in Doyogena, Ethiopia

<https://hdl.handle.net/10568/127333>

Business Plan: Feed processing by sheep fattening youth groups in North Shewa, Ethiopia

<https://hdl.handle.net/10568/127334>

Business Plan « Feed processing » by Boqa Shuta Shaya CBBP and sheep fattening cooperative in Bonga, Ethiopia <https://hdl.handle.net/10568/127314>

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