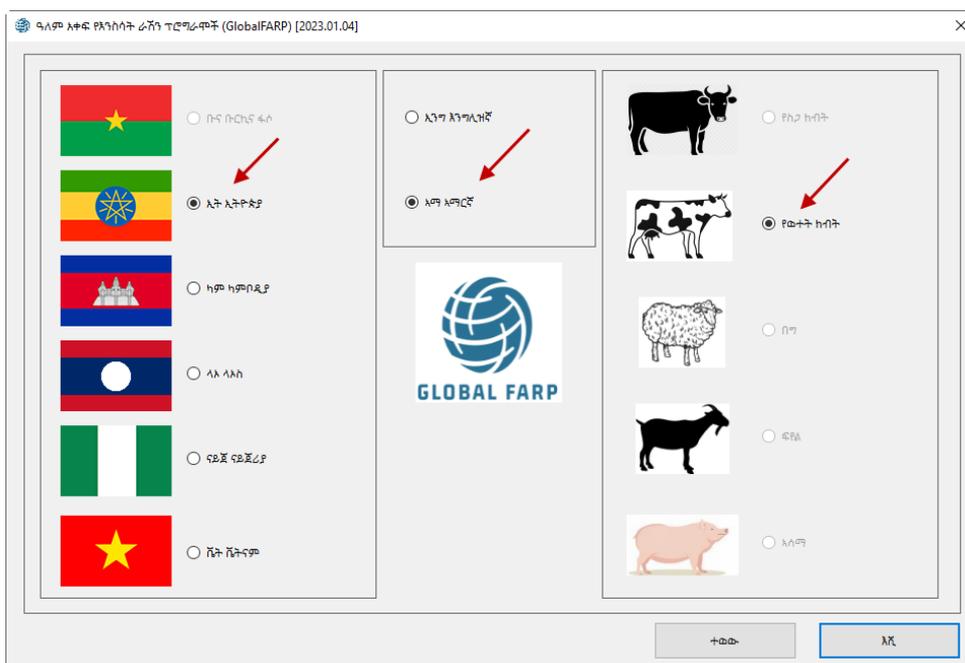Title: **Enhancing farmer productivity, Reducing cost and GHG emission through training farmers and extension agents, researcher in Ethiopia**

With support from the USDA Foreign Agricultural Service (FAS) and in collaboration with the UC Davis team led by Prof. Ermias Kebreab and Dr. Abbas Ahmadi, UNIQUE land use GmbH trained 24 participants, including commercial dairy farmers (8), dairy advisory service providers (2), university lecturers teaching dairy husbandry (10), feed distributors (1) and feed experts from the ministry of agriculture (1), Oromia livestock development agency (1) and livestock and fisheries sector development program (1) on Dairy ration formulation software for Ethiopia in Amharic language.

The training will help to strengthen the national capacity to adopt a balanced rations approach that meets the nutrient requirements of the cattle to optimize productivity, reduce cost, and promote sustainable intensification of dairy production, which supports the national low-emission development goals for Ethiopia's livestock sector. The software was developed that integrated over 276 different local feeds and by-products with nutrient requirements for dairy cattle. The software was available in Amharic (federal language) with an easy-to-use graphical user interface (See figure above).

At the end of the training, all participants were able to formulate a complete dairy ration using locally available feed resources that can be used effectively to reduce the cost of dairy production.

Title-1: University lectures-feed experts from the ministry of agriculture

Title-2: Commercial dairy farmers-dairy advisory service provider

Title-3: Local feed materials.

Selected participant feedbacks

Mr Lencho Alemu

(Dairy advisor, Private commercial dairy production & housing)

I am a dairy advisor working with many dairy farms around Bishoftu and Dukem, Oromoia region. I am highly impressed with how user-friendly Dairy program is to formulating ration using the alternative feed library and evaluating the existing feeding practice of dairy production systems compared to the other tools, i.e., "Rumen8". I cannot wait to see the feed library en-riched, especially the alternate feed library, with a different variety of locally available feed ingredients. I strongly suggest that UNIQUE offer such training and tool to a large number of experts in the field to extend its use. Furthermore, the software should be available in other local languages.

	I am a dairy farm owner and manager. I started dairy farming after I got a gift of one calf from my father-in-law a few years ago. After a while, my business expanded to grow the herd size of 34 cows. I am very excited to learn about using Dairy tools to formulate and evaluate dairy rations for my cows. The introduction of this tool will make my life easier. It will also increase the farm's productivity, and I also believe will increase my farm's profitability. However, most feed ingredients used for my dairy farm are not a part of the alternate feed library in the Dairy tool, which makes it difficult to use the tool.
Mr Chernet Abera **(Owner and Manager, Chernet dairy farm)**	
	My name is Addisu Alemu. I supervise "Ye Habesha dairy farm" with a herd of 43 cows. I also supervise other farms around 'Sendafa' and 'Beke' towns, in the Oromia region. I am impressed with the tool's simplicity, and I am sure it will bring so many changes to my farm regarding productivity and profit. However, besides enriching the alternate feed library with more local feed ingredients, I suggest the tool be converted into mobile apps. Various types of local feed materials are not in the library yet, and huge work is needed to be done on this aspect. I also found "Dairy" easier to use over "Rumen8".
Mr Addisu Alemu **(Supervisor, Ye Habesha dairy farm)**	

Mr Tamirat Bekelle **(Dairy farm manager, Misale agroindustry)**	I work as a dairy farm manager at Misale agroindustry with a herd size of 150 dairy cows. So far, we are not using any kind of ration formulation tool for a herd size of 150 dairy cows. Instead, we feed our dairy cows using manually formulated feed sourced from other feed processing companies. I was extremely happy that my farm's current feeding practice was evaluated as part of the exercise during the training. I found out that we are actually losing money due to a lack of knowledge on the nutrient requirements of our dairy cows and the least-cost diet formulation.
Mr. Besufikad Enideg from Addis Ababa University	As someone interested in starting an animal feed production business, this training has given me invaluable knowledge and skill in ration formulation. The software by itself will be a big help in identifying feed types and ration from different perspectives in improving the struggling livestock sector in Ethiopia. I am eager to use this software and share my skills with colleagues. Hope the software will be updated by taking into consideration the merging of the vast list of similar feed types for ease of use of the software by farmers. I will happily share my views with you regarding the important improvements to be made in the future. I thank you for giving me this chance.
Dr. Debebe Worku from Ambo University	Thank you so much for inviting me to this valuable training entitled 'Training course Ration Formulation for Dairy Cattle in Ethiopia'. In addition, I appreciate you for your well preparedness and interactive training delivery system. This software training (Dairy) is crucial for formulating the feed for dairy animals with the objectives of fulfilling the nutritional requirements of the animal and the least cost feeding system using the available feed resources. I learned how to run the software and exercised how to use it for ration formulation and ration evaluation. However, even if it is a new software in Ethiopia, there are some suggestions: We, in Ethiopia, need to reduce the feed sources repeatedly listed by differing user input numbers. We need to recategorize using geographical information or

	agroecological information. It was very difficult to access the saved data when opening it again. It is also important to develop ration formulation software for other animals i.e beef, sheep and goat.
Dr. Tibebu Kochare from Woilata Sodo University	I am happy to be part of this training, and this is the most relevant training for me as I am a lecturer and researcher of feed and nutrition, head department of animal science, at Wolaita Sodo University. In addition, we have a dairy farm in the university and Ph.D. and MSc programs in Dairy production. We will incorporate this software in to the curriculum/course contents of different programs in the University. However, for the training in general and software specifically, there should be video/YouTube for installation and analysis, repeated use and practice of the software and up-to-date information on time-trainings for different level stakeholders should be planned. For instance, I personally want to repeat this training with other stakeholders like students, staff/researchers, farm owners, managers, business owners, colleagues etc as Wolaita is known dairy producing area starting from WADU and currently there is Jersey farm (regional), feed processing unions, ATVET farm, private farms, research centers.

1. Participants from Universities and research institutes

No	Name	Position and Institution/Place	Phone Number
1	Mr. Dereje Worku	Head of livestock production department Alage ATVET college, Alage	+251937752696
2	Mr. Demeke Mezmur	Dairy development expert, Oromia livestock development sector, AA	+251911926688
3	Dr. Million Tadesse	Researcher on dairy breeding and nutrition, Holeta Research center, Holeta	+251922402486
4	Dr. Derzneh Yilma	Animal feed expert, Ministry of Agriculture	
5	Mr. Yihun Aman Anley	Animal Nutrition department, University of Gondar, Gonder	
6	Mrs. Mekia Bedru	Animal nutrition department, Hawassa University, Hawassa	
7	Dr. Tibebu Kochare	Feed and nutrition researcher, Wolayita Sodo University, Sodo	
8	Mr. Yitayih Ayana	Animal production department, Injibara University, Injibara	
9	Mr. Amsalu Waktola	Animal nutrition department, Haramaya University, Haramaya	
10	Mrs Tikunesh Zelalem	Amhara regional research institute, Gonder research center	
11	Mr. Terefe Benti	Feed and forage expert, Oromia Livestock Fisheries Sector Development Project, A	
12	Mr. Besufekad Enideg	Food security and climate change department, Addis Ababa University, AA	
13	Dr Debebe Worku	Diary Science institute, Ambo University, Ambo	

2. Participants from commercial dairy farms

No.	Farm/Company name	Farm owner name	Herd size	Person represented in the training	Phone no
1	Regional commercial dairy farm program focal person & Dairy production Advisor	**NA**	**NA**	Dr. Tadesse Getu	
2	Private commercial dairy production and housing Advisor	**NA**	**NA**	Mr. Lencho Alemu	
3	Chernet Abera dairy farm	Chernet Abera	34	Mr. Chernet Abera	
4	Ye Habeesha dairy farm	Habesha Muluneh	43	Mr. Addisu Alemu	
5	Koba dairy farm	Esayas Hiruy	96	Mr. Melaku Tsegaye	
6	Seid and Hanan farm	Seid Hassen	40	Mr.Tewabu Assefa	
7	Dereje dairy farm	Ato Dereje	23	Mr. Wondimeneh Dereje	
8	Misale Dairy farm	Zeresgi Iyasu	112	Mr. Tamiret bekele	