

# Report on Africa RISING post-harvest feed management and forage training for farmers and experts

Mohammed Ebrahim, Aberra Adie and Melkamu Bezabih



Produced and published by the International Livestock Research Institute

August 2018

[www.africa-rising.net](http://www.africa-rising.net)

# About Africa RISING

The Africa Research in Sustainable Intensification for the Next Generation (Africa RISING) program comprises three research-for-development projects supported by the United States Agency for International Development as part of the U.S. government's Feed the Future initiative.

Through action research and development partnerships, Africa RISING will create opportunities for smallholder farm households to move out of hunger and poverty through sustainably intensified farming systems that improve food, nutrition, and income security, particularly for women and children, and conserve or enhance the natural resource base.

The three regional projects are led by the International Institute of Tropical Agriculture (in West Africa and East and Southern Africa) and the International Livestock Research Institute (in the Ethiopian Highlands). The International Food Policy Research Institute leads the program's monitoring, evaluation and impact assessment. <http://africa-rising.net/>

This document was made possible with support from the American people delivered through the United States Agency for International Development (USAID) as part of the US Government's Feed the Future Initiative. The contents are the responsibility of the producing organization and do not necessarily reflect the opinion of USAID or the U.S. Government.

# Contents

Training details.....	2
Objectives of the training.....	2
Day one (03 August 2018): Farmers training and field visit.....	3
Day two (04 August 2018): Expert training and field visit.....	5
Response for the questions.....	6

## Training details

Africa RISING in collaboration with GRAD (Graduation with Resilience to Achieve Sustainable Development) project organized training on Africa RISING feed and forage innovations. The training was held on 03 and 04 August 2018 for farmers and experts respectively at Maichew and Emba Hasti kebeles, Endamehoni woreda, Tigray.

On the first day, 48 farmers from Alamata, Ofla, Endamehoni and Emba Alaje woredas did participate. On the second day, 25 GRAD and Agriculture office experts from eight woredas participated. For both groups, the training combined power point presentations, discussion and field visits to scaling sites in Tigray. Forages like tree Lucerne, Oat-vetch, Desho grass, Sweet lupine, Alfalfa, Fodder beet, and post-harvest feed management technologies as well as feed shed and feed trough units at Emba Hasti kebele were visited. Abera Adie and Mohammed Ebrahim covered the forage and post-harvest feed management training respectively.

The GRAD project showed great interest in the post-harvest feed management technologies and is committed to purchase industrial material to construct feed trough technologies for 80 farmers in eight woredas upon farmers and experts completing the training program. The same training will be arranged for farmers in eastern zone (Adigrat) within this month.

## Objectives of the training

- To create awareness for farmers and experts on Africa RISING validated forage and feed technologies
- To share experience from Africa RISING model farmers on feed trough technologies and to scale the technology to the other woredas in the region

## Day one (03 August 2018): Farmers training and field visit



Figure1: Farmers visiting feed trough technology at Emba Hasti kebele

On the first day, 48 farmers from Alamata, Ofla, Endamehoni and Alaje woredas participated on the training. Mohammed Ebrahim, Africa RISING site coordinator in Tigray, welcomed the participant, facilitated self-introductions and then introduced the main objectives of the training.

In the morning session, presentation and discussions were made on tree Lucerne, oat-vetch, sweet lupine, desho grass, faba bean, forage intercropping, feed trough and feed shed. During the discussion, farmers raised some interesting points including how to access the oat-vetch and sweet lupin forage seeds, how to utilize sweet lupine for feed and food, how to use the feed trough for small ruminants. In addition, they raised how feed trough and how feed shed can be self-constructed without the help of additional carpenter.

In the afternoon farmers visited feed trough, feed shed and tree Lucerne technologies at Emba Hasti kebele. During the visit, farmers raised the following questions:

- How the feed trough saves the feed (Crop residue)?
- How was the feed trough constructed? Is it possible to construct using plastic and another material?
- Is it possible to modify it to feed both calf and cow/ox at the same time?
- Will the poor farmers afford to construct the feed trough?

Haftu Arega, Africa RISING model farmer, explained to the visiting farmers about the construction of the feed trough and how he uses. Before constructing the feed trough he said he was used to feed animals on the ground thus there was a high wastage of the crop residue. Feeding animals were also standing on it and mix it with dung, urine and soil. He said, “Now the feed trough saves the feed which would have been wasted, and I am providing enough feed every day for my cattle.” He also showed

the trainees a half heap of crop residue saved because of the efficient use of the feed on the feed trough which was not the case previously especially during a critical feed shortage time like this (August).

Haftu also said that he used five iron sheets, 3.5 kg of nails, eucalyptus tree, other local cheap wood and plastic to construct the feed shed. He also added that the feed trough can be constructed using plastic to reduce the cost and the size can be flexible based on the number animals to be fed on the trough. The plastic on the trough reduce the number of wood to be used as well as prevent the feed to fall out. Haftu also explained that the feed trough can be modified and adjusted so that it fits to all animals of different sizes including calves and sheep. Lastly, he also noted that the feed trough saves labor and time as it helps to keep and feed the animals in one place which helps farmers to go and do their job.

The field visit, in addition to the theoretical training, provided farmers with the opportunity to clearly understand the importance of the feed trough, how it is designed and how it is being used.

Visiting farmers on the other hand, shared their ideas which will help in improving the design of the feed trough:

- The feed trough should have a full top roof cover to protect animals from sun and rain for the day and night.
- The empty space on top of the trough can be used as a temporary storage for some green feeds until wilting.
- It would be good to have partition between animals to avoid animal fight and competition for the feed.
- To construct the trough near to the backyard would help to drain the urine and feces to home garden and minimize feed wastage while bringing the feed from the shed to the trough.

Before the end of the visit, Negasi Tafere (GRAD's training coordinator) expressed his great appreciations to Africa RISING project and the team for introducing the feed technologies and organizing the training and the visit for GRAD beneficiary farmers. He also appreciated the model farmers for sharing their experience on the feed trough and asked the visiting farmers to apply the feed trough technology soon and in turn become a teacher in respective of their VESA (village economic and social association) group and other farmers to scale the feeding trough to wider areas.



## Day two (04 August 2018): Expert training and field visit



Figure 2: Theoretical training for experts of post-harvest feed management and forage innovations

On day two, there were detailed presentation and discussion on Africa RISING validated feed technologies. Aberra Adie And Mohamed Ebrahim made presentations on improved forage and post-harvest feed management technologies respectively.

During and after the presentation the following points were raised and discussed:

- Elephant grass, alfalfa, and tree Lucerne, sesbania, were introduced long time ago but the problem is on adoption. What is your experience on this regard?
- One of the problems with tree Lucerne is its palatability and utilization. What can be done to solve the problem?
- We are appreciating Africa RISING for introducing a variety of forage technology options, but the problem is in seed availability. What is your experience in resolving the seed shortage?
- After seed harvesting, the vetch straw causes animals to cough. Did you know what the reason is?
- Oat vetch technologies needs a separate plot and the land holding size is very small in Tigray. So why not you promote the technologies which do not compete with the scarce land resource?
- The net present value of feed trough and feed shed should be included in economic analysis
- In some areas, it is reported that tree Lucerne flowering stage happens after bees collect their food.
- What if the farmer buys concentrate feed instead of constructing feed trough to compensate for the loss of crop residues because of traditional feeding?

- how we can estimate the amount of crop residue individual farmers produce, and plan for the size of feed shed required? Response for the questions
- For many feed and forage technologies introduced by Government and non-government organizations, the main problem is adoption. So, to address this problem Africa RISING uses participatory on farm research approach. This allows farmers to participate starting from problem identification, selection of intervention, testing and evaluation of new forage trials. With this approach, we have been receiving demand from many farmers for improved forages and the interest of farmers have increased considerably, as can be witnessed in the AR operational sites.
- While small ruminants readily consume freshly cut tree Lucerne foliage, cattle prefer the wilted foliage. Generally, when we see the feeding behavior of farm animals, they select the feed type they have prior experience over the new one. As a result, when they are offered a new feed type (especially legumes due to the presence of aromatic compounds), the outright acceptance may be low. But when they adapt it, they will consume it readily. Therefore, the low palatability observed with tree Lucerne at the first offer is not due to inherent problems but because of the absence of prior exposure to the feed. To allow the animals to quickly adapt the feed (tree Lucerne), it is important to mix it with other forages which animals readily consume. Wilting the foliage prior to feeding for the first time is highly recommended, as the wilting reduces any signal that the feed type is new for the animal. Mixing tree Lucerne with other grasses is important, not only to increase the intake of the fodder, but also to provide a balanced diet for the animals. Tree Lucerne leaf should be used as a protein and energy supplement, and to get an optimal mixture three parts of grasses/residues should be mixed with one part of tree Lucerne (3:1 ratio). So, as a general principle, legume green feeds need to be wilted and mixed with other feeds until the animals adapt them.
- Unlike for the food crops, forage seed system is very weak in the country, and farmers' demand for new forage technologies is very low. To enhance better adoption, Africa RISING demonstrated forage technologies and arranged different awareness creation events such as, field visits, training and experience sharing among farmers. Farmers should maintain forage seed for the next season at least for themselves and share with their neighbours until there comes a better seed system at a wider scale.
- It is advised not to finely thresh the vetch straw and to mix the vetch straw with other (cereal) straws and wet it with water to reduce dustiness while feeding.
- From the research results at Endamehoni site, it was proved that oat-vetch provides the maximum biomass from smaller plots. Due to this, more farmers are interested to grow oat-vetch. In addition to the research results, farmers who grew oat-vetch testify that it increases milk yield by more than 50% and is good for fattening as well. In areas where the land holding size is smaller, forage technologies which provide higher biomass from smaller plots play a vital role by increasing the amount of the feed availability. Oat-vetch proved to be one of the best options in this regard.



- It would be useful to consider adjusting tree Lucerne planting calendar in line with the available bee colonies foraging time so the flower opening and bee foraging time matches.
- Considering the net present value of the feed trough/feed shed, our analysis showed that the technology is worth investing. This is because once they are constructed, they serve for long time, and considering local feed prices the investment can be recovered quickly (for example, within 6 months for feed trough). Feed trough cannot be considered as a replacement for concentrates. The purpose of the trough is to minimize wastage and labor demand. If farmers are finishing cattle, they must feed concentrate feeds/agro-industrial by-products to their fattening animals and if they use feed troughs they can save wastage of purchased concentrates.
- It is possible to use available crop production index data to estimate crop residue yield and advice farmers plan for feed/storage and trough.

In the afternoon, field visit was arranged for experts on the same farmer's field and participants could look at the use of feed trough in improving feed management. Haftu welcomed the experts and did the same explanation as he did for day one. Up one finishing his part participants were then allowed to raised question:

- How you construct and what benefit you are you getting from the feed trough?
- What modification you did on the feed trough, and why the feed trough roof is not too long to protect animals from rain/sun?
- For how long do you keep the feed on the feed trough?
- Have you seen any change in the feed availability and feed intake increment due to the introduction of the feed trough?
- Have you seen any change in animal's product, like milk yield and weight gain due to the feed trough?
- Experts from the government sector - how do you plan to scale the technologies?
- It was suggested the feed trough to be constructed closer with the Crop residue heap to avoid the falling of Crop residue while moving to the trough.

Haftu Aregaw 's response to the questions:

- Initially, I was serving as a carpenter for Africa RISING and get paid to construct many feed troughs at Tsibet and Emba Hasti kebeles. I found the technology very important in saving of crop residue and avoiding crop residue damages. Later, I constructed it in better way at my own homestead by covering all the costs. The feed trough is very important to minimize the feed wastage during feeding and reduce labor to keep animals during feeding. It also helps to mix various animal feeds, including concentrates.
- I used cheap local wood for the side wall and all the 5 iron sheets as a shed. The height of the feed trough is short from one side for calves and higher from the other side for cow/oxen. I have another barn for animals and I didn't find it important to expand the feed trough for sheltering them from rain/sun. If it rains, animals move to the barn
- The feed will stay on the trough for the whole day
- Before constructing the feed trough, I had a shortage of feed because a lot was wasted. However, after using the feed trough I can say I have enough feed for my

animals. The feed trough avoids dung and urine contact and mix of soil. This increase animal feed intake.

- Due to enough feed availability and high feed intake, there is a change in the animals' and cows provide good milk yield.

Before concluding of the field trip and the training, Negasi (GRAD's training coordinator) underlined that the theoretical training and the field visit helped participants to construct the feed trough at their respective homesteads in a short period of time. He said that each farmer is expected to be a model to teach other farmers in their surroundings. Negasi also cautioned extension people to give due attention to scale the technologies to neighboring areas. The experts also promised that they will play their role in promoting the technologies to reach out more farmers.

## Annex 1. List of participant farmers

No	Name	Sex	Woreda	Kebele
1.	Takele kasa	m	Ofla	Zata
2.	Techane gebru	M	Aalje	Mayliham
3.	Getachew reda	m	Alamata	Selam bekalsi
4.	Abadi Girmay	M	Ofla	Menkere
5.	Redae wokele	M	Ofla	Hashenge
6.	Haleom Kiross	M	Alaje	Asela
7.	Redu Kebebe	M	Alaje	Seret
8.	Nguse Kalayu	M	Alaje	Fala
9.	Syum Girmay	M	Ofla	Zata
10.	Zinabu Hadera	M	E.mehoni	Hizba
11.	Segae wolde Gbereal	M	Alaje	Aneduha
12.	Belay Adane	M	Alamata	Limat
13.	Kasahun Abreha	M	Ofla	Hayalo
14.	Sega Berehe	M	Ofla	Adigolo
15.	Kersh Birhanu Negasi	M	E.mehoni	Simret
16.	Kun Birhanu	M	E.mehoni	Simret
17.	Mengsu Arese	M	E.mehoni	Shima
18.	Meresa Tekle	F	E.mehoni	Hizba
19.	Geae Abate	M	Alamata	waja
20.	Sndayo Kebede	F	E.mehoni	Mekan
21.	Meresa berehe	M	Alamata	Tao
22.	Birhane Mendeley	M	Alamaa	Gergale
23.	Birhan Berhe	M	Alamata	Kulgzielemlem
24.	Fsum woldeekle	M	Alaje	Sesat
25.	Haleka Kiros tesfa	M	E.mehoni	E.Hasti
26.	Abbreha Kahsay	M	Ofla	Fala
27.	Tesfa beyene	M	ofla	Fala
28.	Meresa Tasew	M	Ofla	Hasenge
29.	Redae Hadigo	M	Ofla	Hashing
30.	Tuemey Abadi	M	E.mehoni	Tsibet
31.	Ngus Znaw	M	Ofla	Hugumbirda
32.	Asefa Tadese	M	Aalaje	Ayba
33.	Birhanu Temesgen	M	E.mehoni	nkah
34.	Belay Berhe	M	E.mehoni	Neksege
35.	Mahari Ashebir	M	E.mehoni	dum

36.	Manasbew G/michael	M	Alaje	Egre Albo
37.	Hluf Samuel	M	Alje	Teka
38.	Haylu Kiross	M	Alaje	Teka
39.	Habenom Kebedom	M	Alaje	Ayba
40.	Kesh G/medihn Tigabu	M	E.mehoni	Tahtay Haya
41.	Mulugeta Gebru	M	Alaje	Mebal
42.	Abreha Kiross	M	Ofla	Menkere
43.	Kesh Birhanu Aregaw	M	E.mehoni	E.Hasti

## Annex 2. List of participant experts

No	Name	Sex	Organization	Position
1.	Menbere Birhanu	M	Ofla Agri-office	Livestock head
2.	Sigabu G/kidan	M	Gantafeshu woreda	livestock head
3.	Helen G/sadik	F	FREST/k/Alamaa	Marking and value Chain officer expert
4.	Kinfe Tewelde	M	REST/Gantafeshu woreda	Marking and value Chain officer expert
5.	Berhe segae	M	E.Mehoni Agri	Livestock expert
6.	Tekeste G/Kidan	M	REST/mekele	Livestock officer
7.	Alem Gugsu	M	RES/Hwajirat	Livelihood officer
8.	Birhanu Abera	M	RES/Hwajirat	Marketing and livelihood expert
9.	Berhe hluf	m	H/Wajirat Agri	Livestock expert 0914279682
10.	Tesfu kiross	M	REST/E.Mehoni	GRAD Coordinator
11.	Hailasilasie Berehe	M	RST/Endamehoni	Livestock expert
12.	Ngasi Teferi	M	RES/Mekele	Sustainable livelihood officer
13.	Solomon mola	m	RES/Hawzen	Livestock expert
14.	Abadi Gebru	M	REST/OFLA	Marketing officer
15.	Rezene Gebru	M	REST/Hawzen	M&VC officer
16.	Shiferaw Hile Kiross	M	REST/ Mekele	Marketing officer
17.	Haila Ngus	M	REST/mekele	Livelihood officer
18.	Amanuel awash	M	REST/GAfeshum	Livelihood officer
19.	Michael G/Here	M	REST/Alaje	M&VC officer
20.	Tekele Girmay	M	REST/Alamata	Livelihood officer
21.	Ngus Semese	M	REST/Alaje	Livelihood officer
22.	Birhan Kidanu	F	Alamata	Livestock expert
23.	Tesfamariam Mahari	M	Alaje	Livestock expert
24.	Amnuel Atsbaha	M	REST/Ofla	Livelihood officer
25.	Abreha Lemlem	M	REST/Mekele	



ILRI thanks all donors and organizations which globally support its work through their contributions to the [CGIAR Trust Fund](#).

*Patron: Professor Peter C Doherty AC, FAA, FRS*

*Animal scientist, Nobel Prize Laureate for Physiology or Medicine—1996*

Box 30709, Nairobi 00100 Kenya  
Phone +254 20 422 3000  
Fax +254 20 422 3001  
Email [ilri-kenya@cgiar.org](mailto:ilri-kenya@cgiar.org)

[ilri.org](http://ilri.org)  
*better lives through livestock*

ILRI is a CGIAR research centre

Box 5689, Addis Ababa, Ethiopia  
Phone +251 11 617 2000  
Fax +251 11 667 6923  
Email [ilri-ethiopia@cgiar.org](mailto:ilri-ethiopia@cgiar.org)

*ILRI has offices in East Africa • South Asia • Southeast and East Asia • Southern Africa • West Africa*



This publication is copyrighted by the International Livestock Research Institute (ILRI). It is licensed for use under the Creative Commons Attribution 4.0 International Licence. (August 2018)