

National Consultation Workshop on Forage and Forage-Seed Industry Development for Improved Livestock Production and Productivity

Jointly organized by:

The International Livestock Research Institute (ILRI), Ministry of Livestock and Fisheries, the Agricultural Transformation Agency (ATA) and the Ethiopian Institute of Agricultural Research (EIAR)

30 November 2015, Addis Ababa, Ethiopia

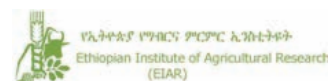


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Workshop Proceedings

These proceedings are prepared by:

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Agricultural Knowledge, Learning, Documentation
and Policy Project (AKLDP-Ethiopia)

List of Acronyms

ACDI/VOCA	Agricultural Cooperative Development International/Volunteers Overseas Cooperative Assistance
AKLDP	Agricultural Knowledge, Learning, Documentation and Policy (project)
ATA	Agricultural Transformation Agency
CRGE	climate resilient green economy
CSA	Central Statistical Agency
EIAR	Ethiopian Institute of Agricultural Research
ESE	Ethiopian Seed Enterprise
FEED II	Feed Enhancement for Ethiopian Development – phase II
FLDP	Fourth Livestock Development Project
GHG	greenhouse gas
GIZ	Gesellschaft für Internationale Zusammenarbeit (the German Federal Enterprise for International Cooperation)
GTP II	Growth and Transformation Plan II
ILRI	International Livestock Research Institute
MOA	Ministry of Agriculture
NRM	natural resource management
NGO	non-governmental organization
QDS	Quality Declared Seed
SLM	sustainable land management
USAID	United States Agency for International Development
USDA	United States Department of Agriculture

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About 11.4 million households are involved in livestock production in Ethiopia. Yet the sector suffers inadequate supply and quality of feed, with livestock productivity low as a result

Introduction and Summary

Livestock plays a significant role in generating income for 80 per cent of rural smallholder households, and in meeting domestic meat and milk consumption requirements (Livestock Master Plan [LMP], 2015). According to the Central Statistical Agency's (CSA) 2013 report, about 11.4 million households are involved in livestock production in Ethiopia. Yet despite the potential for significant economic benefits, the sector suffers inadequate supply and quality of feed, with livestock productivity low as a result. Improved feed supply, quality and feeding practices would increase animal productivity and production. In addition to their feed value, improved forage species also play an important role in minimizing greenhouse gas (GHG) emissions from livestock, improve soil fertility, reduce soil erosion and ensure better crop–livestock integration.

A brainstorming session was held between the following stakeholder organizations to initiate the process of developing a program to help create a sustainable forage and forage-seed industry in Ethiopia: ILRI and ATA (who initiated the discussions), EIAR, the Ministry of Livestock and Fisheries, Ethiopian Seed Enterprise (ESE), the Ministry of Agriculture (MOA)–GIZ Sustainable Land Management (SLM) Program, USDA–Agricultural Cooperative Development International/ Volunteers Overseas Cooperative Assistance (USDA–ACDI/VOCA) FEED II Project, and USAID Feed the Future AKLDP project/Tufts University.

To help speed the process, experts from these organizations prepared a concept note (see Annex III) to serve as the main discussion document during a multistakeholder consultative workshop held 30 November 2015.

Workshop participants focused on five major areas of intervention (pillars) required to solve current seed and feed shortages in Ethiopia:

1. Ensuring effective forage-seed variety release and maintenance procedures
2. Expediting forage-seed certification procedures
3. Ensuring maximum use of the genetic material available in the country – ‘forage-into-use’ – and facilitating import of appropriate varieties
4. Expanded use of forages to address the problems of sustainable land management, soil fertility and natural resources management
5. Promotion of the use of improved forage by smallholder households, as well as commercial farmers, through ‘cut-and-carry’ and other feeding options

Two presentations discussed the past and current situation of forage and forage-seed development initiatives in Ethiopia, while a third dealt with the urgent need for a well-functioning national forage and forage-seed industry program.

Workshop participants identified a number of limitations of past efforts: the limited capacity of existing actors, inadequate infrastructure, limited interaction between actors, poor coordination of system functions and missing key actors during implementation. They also highlighted structural weaknesses in the seed system, which have hindered its development. This in turn has led to a general dysfunction of the forage-seed system and limited understanding of policy tools and instruments to deal with problems.



Workshop participants from Addis Ababa, Oromiya, Amhara, Tigray, SNNPR, Afar and Somali regional states

The workshop also looked to possible actions to facilitate investment in the scaling up of forage and forage-seed development efforts. These actions included:

- enhancement of seed-system actors' capability through training;
- triggering attitudinal and behavioral change by establishing dialogue platforms that enable information and idea exchange;
- stimulating actors' interaction to enable learning activities and create a dynamic seed system;
- ensuring the existence of formal institutions that deal with laws, regulations and procedures;
- strengthening knowledge, physical and financial infrastructures for sustainable seed-system development;
- adaptation of participatory and interactive paradigms for forage-seed development; and
- developing incentive systems to reinforce the culture of inter-organizational collaboration.

Suggested forage and forage-seed industry development program components included:

- strengthening formal institutions dealing with procedures and regulations;
- supporting informal institutions striving to work in forage and forage-seed businesses;
- piloting alternative institutional models for forage technology generation and adoption;
- using a value-chain approach to develop the agribusiness subsector; and
- putting in place a program monitoring, evaluation and learning system.

The workshop ended with participants expressing their buy-in to the decision to design a national forage and forage-seed industry development program for Ethiopia. It was decided to hold a 'writeshop' event (scheduled to take place before the end of January 2016) for the program design, by involving key stakeholders in addition to the existing technical team. There will be a consultation workshop to validate the national program prior to this, financed by the USAID-AKLDP project.

Workshop Background

The national consultation workshop, held 30 November 2015 on the International Livestock Research Institute (ILRI) campus in Addis Ababa, was initiated and jointly prepared by institutions involved in the development of Ethiopia's forage and forage-seed industry for better livestock production and productivity. Prior to the workshop, experts from the Ministry of Livestock and Fisheries, ILRI, ATA, the USAID–AKLDP project and EIAR conducted meetings and developed a concept note to guide the design of a national forage and forage-seed industry development program (see Annex III).

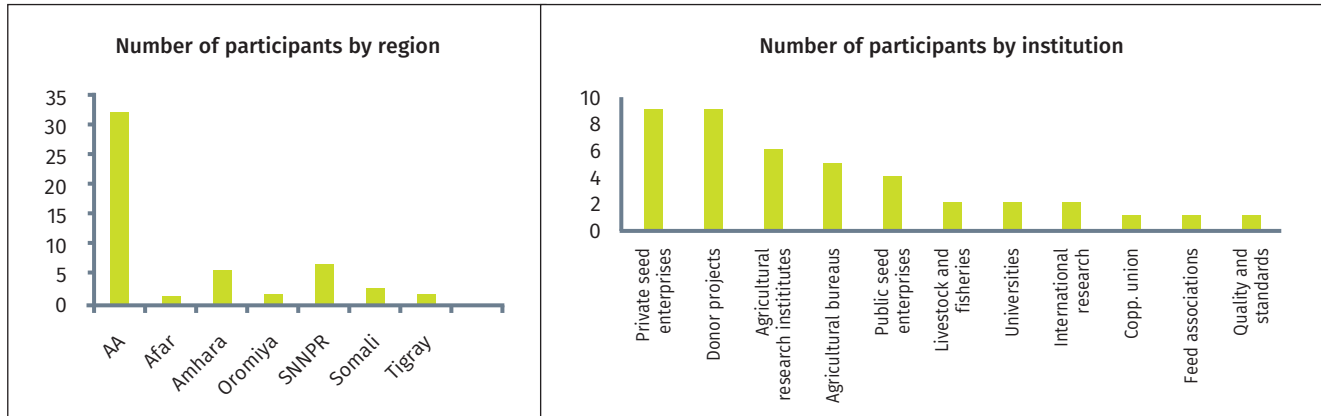
Workshop objectives

There were two prime objectives set for the consultation workshop: to get additional input to help develop a national forage and forage-seed industry program in Ethiopia; and to share the concept note and get buy-in from key (strategic) stakeholders, mainly government, the private sector and the donor community.

Workshop participants

The workshop was attended by 54 participants from federal ministries and institutions, international organizations, regional bureaus of agriculture and livestock agencies, private seed producers and non-governmental organizations. The selection of participants took account of the role each institution could play at the later stage of program implementation. About 95 per cent of the people invited attended the workshop.

Figure 1 Number of participants by region and institution



Workshop Proceedings

Keynote address, Dr. Getnet Assefa

Dr. Getnet Assefa, on behalf of the State Minister for Livestock and Fisheries, made a keynote speech. He mentioned that demand for feed is increasing overtime, while grazing land is reducing. Most farming activity is undertaken by smallholder farmers growing food crops. In addition to lack of land, farmers are also constrained by a shortage of quality forage seed. At the same time, the production and use of improved forages by smallholder farmers is minimal. Dr. Getnet went on to highlight the importance of identifying and addressing key constraints: *“We need to identify strategic issues that are pertinent to forage development. Those engaged in technology development and research and the development actors should work together. The private sector will need to be involved. We have to establish a system that will be sustainable”*.

Photo credit: Berhanu Admassu Abegaz



Welcome address, Dr. Siboniso (Boni) Moyo

Dr. Siboniso (Boni) Moyo, Program Leader of ILRI's Animal Science for Sustainable Productivity and the Director General's representative in Ethiopia, welcomed participants to the workshop. As part of her address, Dr. Moyo mentioned that ILRI has a forage genebank with more than 19,000 accessions of forages from over 1,000 species. The genebank holds the world's major collection of African grasses and tropical highland forages.

She noted that the demand for food, especially animal-source foods, is continuing to rise in Ethiopia and in other developing countries due to population growth, urbanization and increasing incomes, among others. This puts pressure on the livestock sector to produce more milk, meat and eggs. Thus, she noted, productivity will have to increase considerably in order to support demand.

Dr. Moyo said that opportunities exist to reduce yield gaps through research and development to sustainably increase productivity using a combination of improved technologies, enabling policies, and organizational and institutional arrangements. She stressed that the workshop should focus on one key technological component: the forage and forage-seed industry.

According to Dr. Moyo, one of the key 'research for development' priorities of ILRI is increasing use of its diverse and improved forage genetic resources by the ultimate users – i.e. farmers and value-adding agribusinesses linked to the livestock sector. Most recently, ILRI (in partnership with GIZ/BMZ, smallholder farmers, private seed companies and several non-governmental organizations [NGOs]) has been undertaking an initiative on 'Feed Seeds'. The project has managed to identify and train more than 30 enterprises, which have started producing and selling forage seeds developed and maintained at ILRI's forage genebank. However, they need additional capacity development and policy support: "We, at ILRI, are very much proud of being part of this initiative. We are ready to play a pivotal role in this initiative to move the forage and forage seed agenda going forward".

One of the key 'research for development' priorities of ILRI is increasing use of its diverse and improved forage genetic resources by the ultimate users

Dr. Moyo also said that ILRI hosts 10 other centers that are members of the CGIAR Consortium and which are working for a food-secure future. She invited participants to visit some of ILRI's work, and expressed her wishes for a successful workshop.

Presentations

The workshop organizing team identified experienced experts to make presentations during the workshop. Below are summaries of the three presentations.

(A) Forage-seed Development from a Historic Perspective: Building a Case for More Support

Dr. Diriba Geleti is a senior researcher working for Debrezeit Agricultural Research Center under the Ethiopian Institute of Agricultural Research (EIAR). Dr. Diriba commenced his presentation by listing some relevant events related to forage-seed development in Ethiopia, as follows:

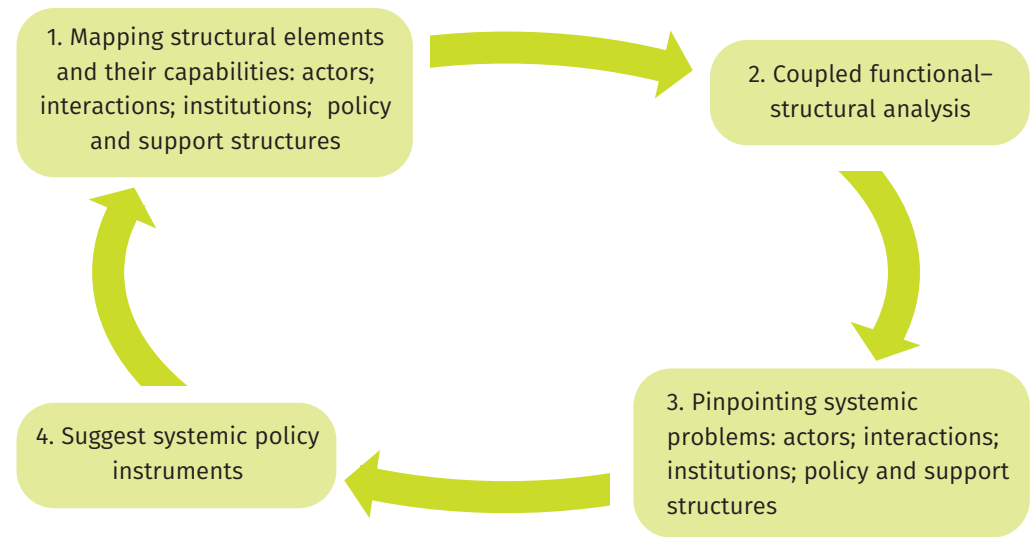
- 1970–1980: Chilalo Agricultural Development Unit/Arsi Rural Development Unite: Heifers delivery + forage/forage seed
- 1971–1975: Wolayita Agricultural Development Unit (WADU): breeding services + forage/forage seed
- 1974–1991: Dairy coops in selected milk sheds + forage/seed options
- 1987–1991: Smallholder Dairy Development Program (SDDP): Heifer distribution together + forage/seed interventions
- 1988–1994: Fourth Livestock Development Project (FLDP): Significant attention given to forage/forage seed
- 1999–2002: National Livestock Development Program (NLDP): Remarkable investments on forage/forage seed
- USDA-supported ACDI/VOCA FEED-I and FEED-II Projects: Forage systems; forage nurseries
- 2011–2015: Growth and Transformation Plan (GTP) I: Feed development considered to be key component of livestock extension
- 2012–2015: Agriculture Growth Program–Livestock Market Development Project: Improve income and nutritional status through investment in livestock value chains (meat, dairy, hides); capacity building on forage production as priority area
- 2013–2018: Livestock and irrigation value chains for Ethiopian smallholders (LIVES): Enhanced income of farmers through increased and sustained market off-take of high-value livestock commodities
- October 2015: Ministry of Livestock and Fishery resources: Ambitious year 2020 feed/forage-seed plans to overcome forage/seed shortages

Despite these efforts – past and present – the vast majority of farmers do not use improved forages.

“Sustainable access to certified forage seed entails a forage-seed economy that is dynamic, inter-linked, harmonized and well coordinated”

Dr. Diriba then looked at the structural and functional weaknesses of forage-seed programs/systems in the past, and asked what policy tools were required for the design of a successful forage-seed development program in future. He explained that sustainable access to certified forage seed entails a forage-seed economy that is dynamic, inter-linked, harmonized and well coordinated. The structural dimensions in this regard are: who (actors), the nature of actors' interactions, the 'rules of the game' influencing interactions, and supporting infrastructures. Dr. Diriba emphasized the need to ensure sustainable availability of certified forage seed and a well-functioning

Figure 2 Structural–functional framework to unravel system problems



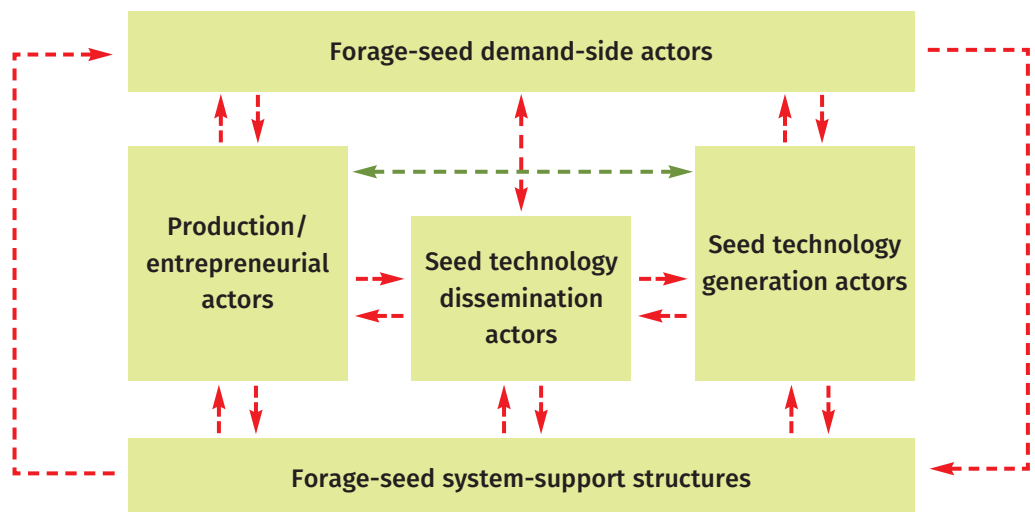
and regulated forage-seed value chain. Entrepreneurial knowledge development and exchange, guided research, market development and market information, resource mobilization and advocacy were also stated to be key components for the development of the forage-seed industry.

The success of future forage-seed schemes depends on proper identification of systemic failures that have hindered past programs and the selection of systemic instruments for future consideration. In this regard, Dr. Diriba outlined a structural–functional framework to unravel system problems (see Figure 2).

He also presented Figure 3 to show the structural elements of the Ethiopian forage-seed system.

Dr. Diriba went on to address systemic problems embedded in the Ethiopian forage-seed system, and systemic problems embedded in the structural elements of the

Figure 3 Structural elements of the Ethiopian forage-seed system



system. He highlighted the functions of the forage-seed system from the perspective of these structural elements. He then presented a coupled functional-structural analysis of Ethiopia's forage-seed system (see Table 1).

Table 1 Coupled functional–structural analysis of forage-seed system

Function	Pinpointed functional imperfections	Systemic problems inducing the functional imperfections
Entrepreneurial function	• Limited number of private forage-seed production actors	• Missing actor problem • Hard institutional failures
	• Limited interaction among existing entrepreneurs in the seed system	• Weak interaction problem
	• Lack of market for seed of the nascent private seed producers	• Market structure failure • Hard and soft Institutional failures
	• Lack of irrigation facilities and access to irrigable land for year-round seed production	• Physical infrastructure problem • Demand articulation problem • Institutional problem • Policy enforcement problem
	• Majority of farmers practicing traditional livestock feeding systems • Knowledge-intensive nature of forage-seed crop husbandry	• Informal institutional failure (locked in traditional practices) • Knowledge infrastructure problem
	• Farmers lack capital to purchase improved forage seed	• Financial infrastructure problem
Forage-seed knowledge generation functions	• Seed research capacity of national research entities underdeveloped	• Physical/knowledge/ financial capability failure
	• Narrow research focus on seed technology generation and dissemination	• Hard/soft institutional failure
	• Inadequate knowledge on institutional arrangements for coordinating complementary sources of knowledge for forage-seed sector	• Knowledge/skill capacity failure • Coordination failure • Soft institutional failure
	• Little attention given to organizational innovations to forage-seed technology generation	• Knowledge/skill capacity failure • Soft institutional failure
Knowledge dissemination function	• Extension workers lacking access to adequate knowledge of forage-seed production technique	• Knowledge capability failure; financial capability failure
	• Inadequate capacity of the public extension system in forage seed-related knowledge diffusion	• Knowledge/financial/physical capacity failure
	• Lack of coordination between knowledge dissemination actors	• Weak/strong interaction failure • Directionality failure • Policy enforcement failure
	• Budget constraints for extension agents to run seed development-related activities	• Financial infrastructure failure
	• Poor-quality extension service delivery	• Hard/soft institutional failure • Capability failure

Function	Pinpointed functional imperfections	Systemic problems inducing the functional imperfections
Policy and strategy (guidance of research) function	<ul style="list-style-type: none"> Weak/poor law enforcement Lack of articulated forage-seed strategy 	<ul style="list-style-type: none"> Hard institutional failure Soft institutional failure Directionality failure Policy coordination failure
	<ul style="list-style-type: none"> Limited recognition given to forage-seed subsector Minimal focus on provision of resources and operationalization of forage-seed sector plans 	<ul style="list-style-type: none"> Policy coordination failure Soft institutional failure Resource mobilization failure
	<ul style="list-style-type: none"> Limited attempts to joint vision creation and coordination of forage-seed system structural elements 	<ul style="list-style-type: none"> Interaction failure Policy coordination failure Reflexivity failure Capability failure
	<ul style="list-style-type: none"> Poor-quality public extension service delivery 	<ul style="list-style-type: none"> Knowledge/skill capacity failure
Creation of legitimacy function	<ul style="list-style-type: none"> Public seed production actors not interested in forage-seed production 	<ul style="list-style-type: none"> Knowledge infrastructure failure Market failure Soft institutional failures Policy coordination failures
	<ul style="list-style-type: none"> Forage-seed production investment plan pushed to peripheral regions 	<ul style="list-style-type: none"> Physical infrastructural failures Policy coordination failures Reflexivity failures
	<ul style="list-style-type: none"> Allocation of prime-quality land in the highland areas to forage-seed business is not likely 	<ul style="list-style-type: none"> Hard institutional failures Physical infrastructure failure
	<ul style="list-style-type: none"> Weak professional society actors for advocacy/promotion of forage-seed subsector 	<ul style="list-style-type: none"> Missing actor problem Interaction problem Coordination

Conclusions and suggested areas of investment and intervention

Dr. Diriba's analysis of past forage-seed development programs in Ethiopia, among others, indicated the following conclusions:

- Widespread issues in past programs included: limited capacity of actors, inadequate infrastructure, limited interaction between actors, poor coordination of system functions and the missing actor problem. These problems still exist in some programs currently being implemented.
- The analysis also showed that structural weaknesses in the seed system have hindered the development of seed-system functions. In addition, a weakness in one system function will have a knock-on effect on other functions, leading to general dysfunction of the forage-seed system.
- The implication, thus, is that there is no single, all-encompassing intervention that would address all the problems in the forage-seed system. A combination of classical policy tools and systemic policy instruments has to be employed to deal with complex problems embedded in the forage-seed development program.

A combination of classical policy tools and systemic policy instruments has to be employed to deal with complex problems embedded in the forage-seed development program

Photo credit: Berhanu Admassu Abegaz



Based on findings from this analysis, the following areas of investment and intervention were suggested for the envisaged forage/forage-seed development investment program of Ethiopia.

Suggested areas of investment for strengthening and scaling-up the forage/forage-seed industry:

- enhancement of seed-system actors' capability through training;
- triggering attitudinal and behavioral change by establishing dialogue platforms that enable information and idea exchange;
- stimulating actors' interaction to enable learning activities and create a dynamic seed system;
- ensuring the existence of formal institutions that deal with laws, regulations and procedures;
- strengthening knowledge, physical and financial infrastructures for sustainable seed-system development;
- adaptation of participatory and interactive paradigms for forage-seed development; and
- developing incentive systems to reinforce the culture of inter-organizational collaboration.

Suggested areas of intervention/program components:

- institutional strengthening to formal institutions for better implementation of forage-seed regulations and interventions on informal institutions;
- support to piloting alternative institutional models for forage technology piloting;
- support to technology generation-related activities;
- support to value-chain and agribusiness development; and
- program management (monitoring, evaluation and learning).

Questions and comments

After the presentation, the following issues were clarified in response to questions from participants:

- In response to a question on the FLDP farmer-based contractual production project, the presenter answered that this was phased out as a result of lack of financial

planning and resources. He later noted in response to another question that FLDP did not succeed in forage development because when the project came to an end, nobody was able to buy seed from farmers. Farmers became discouraged and stopped producing seed as a result.

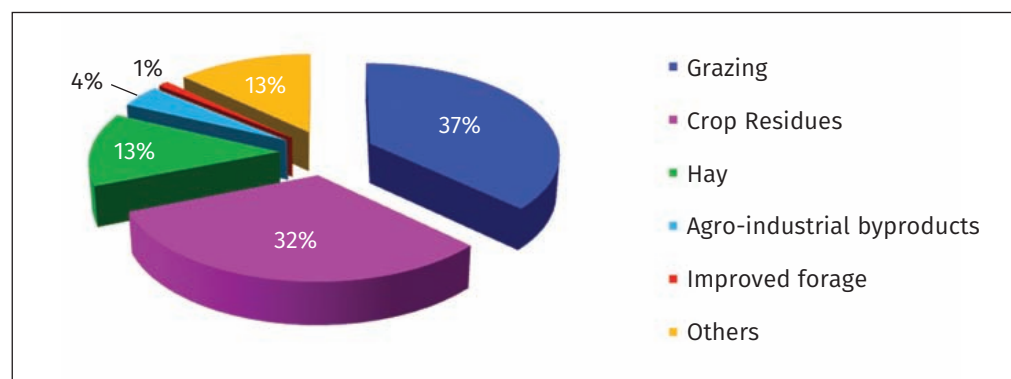
- In response to a question on policy changes, it was observed that the period from 1974 to 1994 saw a more socialist system take over from earlier capitalist ideology. During this period, cooperatives received major emphasis and a majority of farmers were disregarded unless they were coop members. At the same time, not enough emphasis was given to regulations, procedures and rules pertaining to the forage and forage-seed value chain.
- Asked why SNV, the ILRI Feed Seed Project and Africa RISING were not mentioned during the presentation, Dr. Diriba said that these were valued pilot programs, with many stakeholders involved. However, this made it difficult to investigate systematic and partial weaknesses.

Final questions prompted the presenter to observe that the land issue was a key problem, with not enough attention given to land allocation for forage development. Not considering forage production as a business venture is also a key drawback.

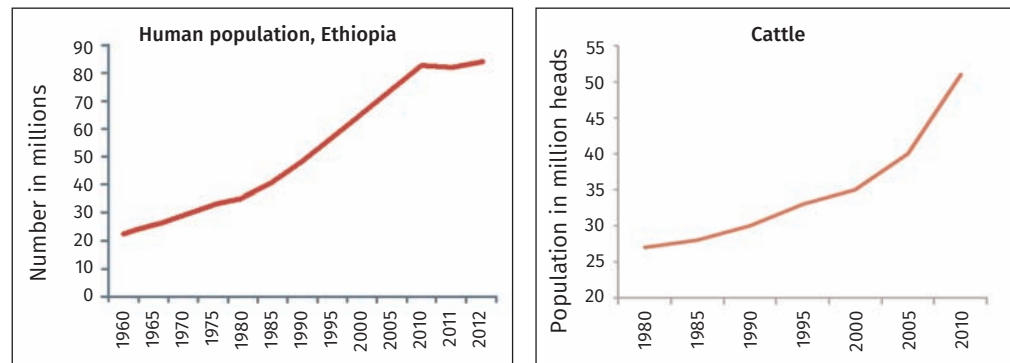
(B) Current Scenarios of Forage and Forage-seed Production and Use in Ethiopia

Dr. Getnet Assefa is a director for livestock research with EIAR. He began his talk by indicating that the use of forage as a feed in Ethiopia is characterized by inadequate supply, poor quality and variability in supply over seasons. Through better management and efficiency, available feed resources could be better used. However, a transformation of livestock production requires an increase in the supply of feed. As indicated in Figure 4, grazing and crop residues constitute the largest part of feed supply, and use of improved forages is extremely limited. The speaker also mentioned that there is a negative feed balance under the existing livestock production system.

Figure 4 Major feed resources available (CSA, 2014/15, sedentary areas)



According to the projections shown in Figure 5, there is an urgent need to increase the supply of good-quality livestock feed to respond to increased livestock and human populations.

Figure 5 Projections for human population and cattle in Ethiopia

A combination of different types of animal feed is required, in particular: supplement feeds such as grains (currently limited); agro-industrial byproducts (also limited, although molasses has potential); and improved cultivated forage crops (with high potential to grow). In terms of the current situation, forage crops are the primary option; these could provide a high-quality basal diet or be used as a supplement to crop residues. The comparative advantages of forage crops include:

- farmers can produce them around their vicinity;
- forage crops are productive and high in quality;
- forage crops could be integrated with natural resource management (NRM);
- they are diverse in species and relatively cheap, while there are also many varieties or species that are registered and recommended for multiplication;
- there are species suitable for different agro-ecologies and production systems;
- forage crops help address climate change through, for example, carbon sequestration; and
- various feeding strategies are available.

Even though demand for forage is increasing over time, the adoption rate is low

Even though demand for forage is increasing over time, the adoption rate is low. Some of the reasons for this include that the dominant livestock production practice is still subsistence, which is not market oriented, scarcity of land and seed or planting materials, and dominance of traditional production practices, where cattle are kept mainly for traction based on free grazing.



Forage field – Panicum grass



Forage grass-stocking method



Seed maturity determination



Different types of forage seeds

Regarding the current situation of forage seed and planting materials in Ethiopia, Dr. Getnet observed the following limitations: the availability of few species of seed; lack of engagement of public seed enterprises; poor understanding and estimates of national demand; limited production technologies; lack of experience and skills; and inflated seed prices due to short supply. However, some positive aspects also exist. These include the seed yield for different forage species, suitable agro-ecologies and sites for forage-seed production, fertilizer application standards, seed management and harvesting, threshing, cleaning and processing techniques, and germination testing.

Ethiopia has national seed standards for 26 forage species: 10 grasses, 12 legumes, 3 browse trees and 1 root crop

The presentation went on to address the existing systems of national forage-seed standards and certification procedures. It was mentioned that Ethiopia has national seed standards for 26 forage species: 10 grasses, 12 legumes, 3 browse trees and 1 root crop. The standards are categorized into two: field standards – where land requirements, crop rotation, crop isolation, packing and marketing of forage seeds are inspected; and laboratory standards – where seed purity, diseases, germination and moisture content are checked.

Figure 6 The institutional set-up of seed certification

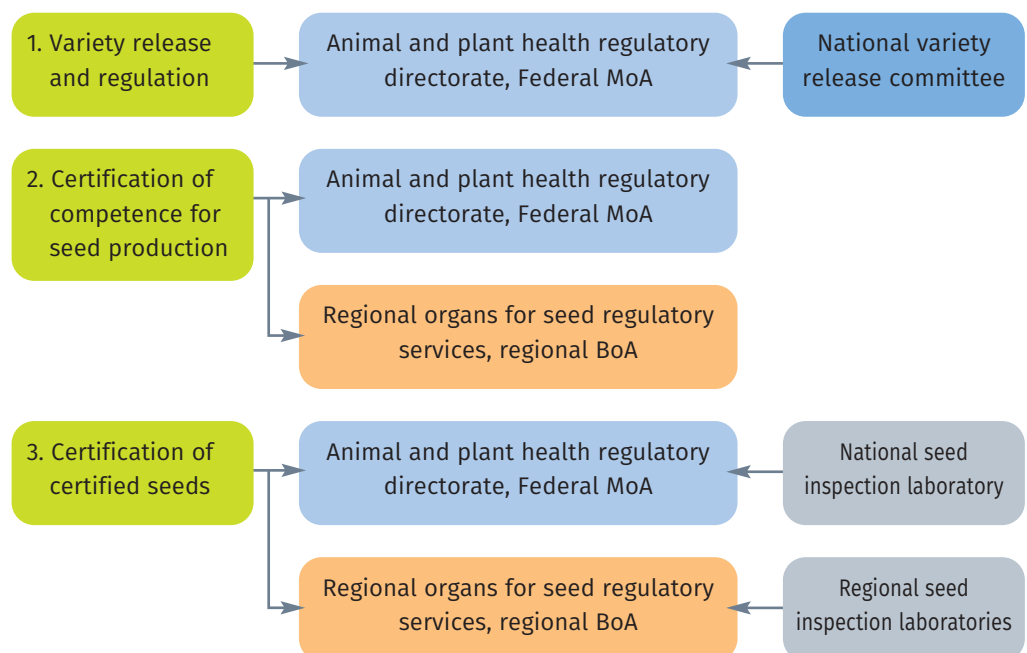


Photo credit: Kelley Lynch/
CNFA US



According to the presentation, the major challenges faced in forage-seed certification are inefficient seed certification services due to the limited institutional, physical and human capacity of certification service providers; and incomplete coverage of the certification process along the seed value chain. Regarding forage and forage-seed development in Ethiopia, meanwhile, problems include the low level of intensification of livestock production, poor market orientation and free grazing practices; and increased population, increased food crops production and scarcity of land for forage production. In addition, limited access to livestock technologies, knowledge and support to farmers, lack of adequate and quality forage seed and planting materials of recommended species and varieties, and lack of appropriate and realistic information represent additional obstacles.

In addition to focusing on improving the quality of crop residues as feed, research should also promote the use of improved forages for better livestock productivity

Nonetheless, Dr. Getnet also mentioned a number of opportunities to promote the growth of the forage and forage-seed sector. These include a supportive government investment policy for livestock production, increasing demand for livestock food sources locally and internationally, and the availability of diversified agro-ecology and of recommended technologies for the production of different forage and forage seed. The existence of various development initiatives where forage integration is possible, including NRM, sustainable land management (SLM) and climate-resilient growth economy (CRGE), provides another opportunity.

Finally, Dr. Getnet recommended the following approaches for forage development in Ethiopia:

- linking forage production to market-oriented livestock systems;
- linking forage production to current farming practices, natural resource management, use of marginal lands, etc.; and
- providing a strong extension system and support, including:
 - training,
 - strong follow-up,
 - creating market linkages,
 - establishing efficient input/output supply and marketing systems, especially for forage seeds.

Questions and comments

After the presentation, the following issues were clarified in response to questions from participants:

- In response to a question about crop residues, Dr. Getnet clarified that the 37 per cent of total feed share included pastoralists.
- In response to a question about research into improving the nutritional value of crop residues as animal feed, the speaker noted that such research is limited to a few feed resources. He said that in addition to focusing on improving the quality of crop residues as feed, research should also promote the use of improved forages for better livestock productivity.
- Another participant asked if it was economically feasible to produce forages, to which Dr. Getnet responded that while demand for forages is high, it differs from place to place.
- In response to a question about bottlenecks to an efficient seed system, the speaker noted that farmers' attitudes to livestock management was the biggest problem: farmers tend to engage in what they used to do traditionally rather than trying new ways of animal feeding and production.
- Finally, in response to a question about improving seed quality, Dr. Getnet observed that policy incentives and subsidies are needed to transform subsistence farming to commercialization.

Policy incentives and subsidies are needed to transform subsistence farming to commercialization

The following additional comments were forwarded from participants:

- Producing feed has a trade-off – production of grains as compared to production of forage and forage seed. It is important for farmers to compare economic return.
- Each farmer's priority is to feed his or her family by whatever means.
- Some farmers may prefer not to produce forage – hence the need to change this mind set. The experience from Afar region shows that priority is given to maize production rather than forage species. One option to introduce forage production could be intercropping of forage species with other food crops. More intervention is needed for better forage adoption and use by farmers.

(C) Scaling-up Forages and Forage Seed in Ethiopia: Suggested Purpose and Outcomes of the National Stakeholder Consultation

Dr. Barry I Shapiro is a senior livestock adviser and leader of a ILRI–GIZ-funded project called FeedSeed. Dr. Shapiro's presentation was on the expected outcomes of the national consultation workshop, discussing why it is important to scale-up the Ethiopian forage and forage-seed industry nationwide. He made the presentation on behalf of the technical team that developed the concept note and prepared the consultation workshop.

ILRI and ATA initiated the process, with the following institutions also involved: EIAR, the State Ministry of Livestock Production, Ethiopian Seed Enterprise (ESE), MOA-GIZ Sustainable Land Management (SLM) Program, USDA-ACDI/VOCA FEED II Project, and USAID-Tufts University AKLDP.

The benefits of improved forages were that improved feed supply, feed quality and feeding practices would increase animal productivity and food production

Dr. Shapiro observed the benefits of improved forages were that improved feed supply, feed quality and feeding practices would increase animal productivity and food production. Higher animal productivity, in turn, would improve smallholder farmer incomes, food security, nutrition and health. Improved animal productivity would also minimize GHG emissions from livestock, improve soil fertility, reduce soil erosion and improve the benefits of crop-livestock integration.

He went on to highlight that better production and use of improved forages depends on the availability of certified quality forage seed, adapted to different agro-ecological conditions; seed being produced and delivered through a well-functioning and regulated commercial seed industry; and seed prices being affordable to users. Improved forage production and use also depends on users: who they are and how they get the feed and use seed. Users include: smallholder farmers – first and foremost, dairy farmers and processing companies, animal fatteners/meat processors and, whenever needed, seed importers.

The primary purpose of the stakeholder consultation was: to provide an opportunity for *multistakeholder input* into the design of the national forage and forage-seed industry development program, owned by the stakeholders. The proposed areas of intervention (pillars) (for discussion by workshop participants) were as follows:

1. Ensuring effective forage-seed variety release and maintenance procedures
2. Expediting forage-seed certification procedures
3. Ensuring maximum use of the genetic material available in the country – ‘forage-into-use’ – and facilitating import of appropriate varieties
4. Expanded use of forages to address the problems of sustainable land management, soil fertility and natural resources management
5. Promotion of the use of improved forage by smallholder households as well as commercial farmers through ‘cut-and-carry’ and other feeding options

Dr. Shapiro then summarized the challenges and opportunities for a national forage and seed program, as follows:

- Analyze national forage and forage-seeds supply and demand with appropriate procedures
- Improve seed quality control and release and certification process over the long run
- Set up quick-release procedures enacted now – until release and certification procedures and process is in place
- Develop models for forage and forage-seed supply and agribusiness development
- Tie into various ongoing national development initiatives like NRM, SLM, CRGE etc. to promote and better integrate forage production
- Promote forage-seed industry development and forage use by linking into market-oriented livestock development initiatives led by NGOs and donors



Forage seeds harvesting. Photo credit: Berhanu Admassu Abegaz

- Develop capacity of lead farmers and pastoralists, development agents etc. through stronger extension, credit services and market linkages
- Develop and support a national platform of livestock sector stakeholders to consult and act on sector issues – technology, policy

Finally, the speaker outlined a way forward – A road map for developing a national forages and seed program, as follows:

1. Set up a program writing team to develop a fundable program proposal by the end of January 2016
2. Add more experts and stakeholders to the existing writing team
3. Consider forming an interim technical advisory committee representing government, the private sector, NGOs and research
4. Draft the national program, including an implementation strategy, financing options, an action plan and impact indicators
5. Hold a second national consultation on the proposed program
6. Agree on an action plan to implement the national program and which institution(s) should serve on a steering committee

Questions and comments

After the presentation, the following issues were clarified in response to questions from participants: that forage production really can be profitable for smallholder farmers; a system of certification is necessary; and that the design of the national program will include how to link production of forage and forage seed with the market or final consumers.

Participants provided the following additional comments:

- The starting point for future intervention should be to make a critical analysis of past failure. The analysis should include technical and institutional perspectives, and should lead to the identification of critical gaps.
- Pillars No. 1 and 2 can be merged, while the 3rd, 4th and 5th Pillars can also be merged into one comprehensive thematic area. The issue of innovation in forages should also be captured, and a value-chain approach considered. There should be strong linkages between different actors while implementing the national program.
- Regarding land scarcity, there is good potential on the hillsides and in the mountain areas for forage development. The engagement of the natural resource management unit at the Ministry of Agriculture is also very important. With the expansion of human population and shrinking productive land, forage production on marginal land will be a good option.

(D) Group and Plenary Discussions

The participants were randomly arranged into six groups and each group was asked to brainstorm on the concept note and make an overall analysis of the existing forage and forage-seed system by identifying strengths, weaknesses, opportunities and threats. The outcome of the group discussion will be further analyzed and used in the development of the national forage and forage-seed industry program.

Table 2 Summary of results of the group work

Strengths	Limitations
<ul style="list-style-type: none"> • The concept note is indicative of the scope of the problem and good program approach • Use of public-private partnership (PPP) approach from earlier projects • Multistakeholder approach on wider issues • Existence of multidisciplinary team • Use of inclusive value-chain approach • Focus on seed certification requirements (quality standards – variety, germination, purity etc.) • Forage variety development and release by research institutes and universities • Addressing forage issues along with forage seed • Forage-seed development linked to national SLM, NRM and soil fertility programs • Efforts made by regions and previous national programs serve as learning experience • Availability of best practices (e.g. in pastoral areas) • Proper maintenance of genetic resources • Forage development as potential contributor to biodiversity 	<ul style="list-style-type: none"> • Insufficient analysis of supply-chain actors and how to link suppliers to the market • The five pillars are not exhaustive, e.g. marketing issues are not addressed • The concept note does not show forage and forage-seed system to be developed using a value-chain approach • Who should multiply and market pre-basic and basic seed not clearly indicated • Who should multiply and market certified/ quality declared seed (QDS) is not well addressed • The economic feasibility of purchases by smallholder farmers, government and NGO programs is not analyzed and compared • Drought/forest tolerant species are not identified • Use of grazing and marginal lands was not sufficiently addressed in the past • Missing policy measures on the improvement and management of communal grazing land and waste lands – like ‘sharing of benefits’ • Total demand for forage and forage seed is not estimated

<ul style="list-style-type: none"> • Feed (forage) identified as priority livestock development compared to breeding and the feed industry starting to emerge • Involvement of private sector in forage-seed business 	<ul style="list-style-type: none"> • The forage-seed system is not incentivized • The potential to produce and export commercial fodder is not studied • There is not enough experience by farmers on forage-seed production or management • Poor market information system • Lack of best practices in the seed sector in general • Inefficient public and private forage-seed production system (basic and certified) • Lack of relevant academic programs focusing on forage seed • The seed cycle (seed generation) not properly traced • Low emphasis on indigenous forage crops • Inadequate crop and forage-seed laboratories and certifications • Insufficient national forage standards and absence of technical support to producers • Limited capacity of the private sector in forage-seed multiplication • Limited institutional capacity of research and academic institutions • Weak 'research-extension' linkages – poor scaling-up of technologies • Limited use of ILRI's genetic material by the public
Opportunities	Threats
<ul style="list-style-type: none"> • Certification system can follow the system already developed for other crops • Use of existing community-based seed production cooperatives • Availability of basic forage-seed pool at ILRI and genetic diversity in Ethiopia • Expansion of knowledge using institutes that can deliver capacity-building activities • Availability of universities and training institutes • Rural economic development – and food security (RED-FS) (forage seed can be incorporated) • Forage contributes to the response to climate variability • Declining communal grazing land leading farmers to look for other alternatives, such as forage development • NGOs' support in forage-seed multiplication • Supportive policy arrangement • The emergence the Ministry of Livestock Production and Fisheries 	<ul style="list-style-type: none"> • Unregulated forage-seed market, thus distorted market price discouraging quality seed producers; brokers dominate the seed market • Majority of seed in the market is substandard • Improperly managed forage-seed production – seen as a weed that threatens crop production • Infant forage and forage-seed industry • Inadequate multisector coordination, such as with NRM and SLM initiatives • Limited experience in forage-seed standards and certification • Very limited use of forage seed and forages by smallholder farmers • No exit strategy for NGOs' free seed distribution, characterized by lower adoption rate of cultivated forages and inefficient use of the free seed • Lack of critical inputs (land, basic and breeder seed, working capital, technical knowledge etc.)

<ul style="list-style-type: none"> • Emphasis given to forage and forage seed, and the targets set on the livestock master plan and GTP II • Government interest in developing the livestock sector • Possibility of integrating forage in NRM, SLM and CRGE activities (multipurpose use of forage crops) • Growing demand for forage and forage seeds • Growing demand for animal-source foods • Enough actors: producers, suppliers and market • Private sector interest in livestock development • Government irrigation initiatives • Existence of private seed producers and coops 	<ul style="list-style-type: none"> • Ethiopia's diversified agro-ecology requires diversified genetic materials with the right quality and quantity • There is a competing interest between the use of land for food crops as compared to that for forage production • The development of the forage and forage-seed sector depends on the development of the livestock sector – but there are several environmental risk factors related to livestock, such as GHG emissions • The Ministry of Livestock Production and Fisheries has just been created and its functionality at regional level may take time
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Reflections on Next Steps

As a logical follow-up to the national consultation workshop, participants suggested speeding up the development of a fundable program proposal. The concept note, along with the additional inputs provided by the plenary, should be used as a basis for writing the national forage and forage-seed development program. In addition to the existing technical team, it was suggested to include or consult knowledgeable individuals from relevant institutions such as higher-education institutions, agricultural research institutions, government offices responsible for land allocation and other infrastructural services, regulatory offices, private commercial seed producers and their associations, professional associations, model farmers, cooperatives and NGOs. The team will then come together and draft the program proposal through a 'writeshop', and present it at a national consultation workshop to convene back by the end of January 2016.

Closing remarks – Mr. Adrian Cullis

Mr. Adrian Cullis is the Chief of Party for the USAID–AKLDP Project and has played great role in the technical team, as well as in securing funding for the workshop. During his closing speech, Mr. Cullis thanked participants and observed Ethiopia's wealth of agricultural knowledge and the value of the participatory exercise. He observed the importance of continuing to discuss real demand: *"Do we have the right seed to grow the right forage that farmers want?"*.

In suggesting a way forward, Mr. Cullis mentioned the importance of the GTP II document and the concept note, and further suggested looking deeper into the interesting ideas, views, strengths, challenges and opportunities discussed in the workshop. Important success factors include the process creating some level of interest among senior people and the program benefitting smallholder farmers in terms of nutrition and income.

"Do we have the right seed to grow the right forage that farmers want?"

ANNEXES

Annex I: Workshop Agenda

National Consultation Workshop on Forage and Forage-Seed Industry Development for Improved Livestock Production and Productivity in Ethiopia

30 November 2015

ILRI Labella Auditorium, Addis Ababa

OBJECTIVES

- To get input that would help develop a national forage and forage-seed industry program in Ethiopia
- To get buy-in from key (strategic) stakeholders, mainly government, the private sector and the donor community

AGENDA

08:30 Registration

09:00 Welcome and introduction

Siboniso (Boni) Moyo, Program Leader (Animal Science for Sustainable Productivity) and Director General's Representative in Ethiopia

Key note speech

H.E. Dr. Gebregziabher Gebreyohannes, State Minister of Livestock and Fisheries

Introduction of participants, agenda and process (Facilitator)

09:30 Presentation about past and current experiences of forage and forage-seed development in Ethiopia

- Past experiences of forage-seed development in Ethiopia (lessons learnt and challenges), Dr. Diriba Geleti, EIAR
- Current scenarios of forage and forage-seed production and use in Ethiopia (challenges and opportunities), Dr. Getnet Assefa, EIAR
- Q&A

10:30 Group photo and networking break around coffee/tea

11:00 Scaling-up forage and forage-seed industry in Ethiopia and the intended outcome of the national consultative workshop, Dr. Barry I. Shapiro, ILRI

- Q&A

12:00 Lunch break

13:00 Visioning forage and forage-seed industry development concept note: Group discussion on strengths, weakness and opportunities

14:00 Feedback from groups

15:00 Coffee/tea break

15:30 Next steps

17:00 Close

Annex II: List of Participants

S/N	Organization	City	Name	Telephone
1.	Somali Seed Enterprise	Jigjiga	Ato Abdirahman Mohammed Ahmed	0915330915/0258750598/ 0915739892
2.	Somali Region Pastoral and Agricultural Research Institute (SORPARI)	Jigjiga	Ato Abdi Mohammed Ali (Ato Daniel Seyoum)	912608035
3.	Somali Bureau of Agriculture	Jigjiga	Ato Mohamed Abshir	929256476
4.	Amhara Bureau of Agriculture	B/Dar	Ato Muluken Zerihun	933924460
5.	Amhara ACC	B/Dar (ATA)	Ato Belete Anteneh	918779016
6.	Tigray Agricultural Research Institute (TARI)	Mekelle	Dr. Zelalem Tesfaye	915700297
7.	SNNPRS Seed Enterprise	Hawassa	Belay Harrisso	934750775
8.	Southern Agricultural Research Institute (SARI)	Hawassa	Bereket Zelleke	938023400
9.	SNNPRS Bureau of Agriculture	Hawassa	Asrat Tera	916832007
10.	Afar Agricultural Research Institute (AARI)	Semera	Anwar Seid	911562968
11.	Afar Pastoral Agriculture Development Bureau	Semera	Ali Umer	912859820
12.	Anno agroindustry	Oromiya/Anno	Dr. Tesfaye Kumsa	912162403
13.	Green Mesk PLC	Amhara/Kombolcha	Mesfin Kiflu	0911434870/0911005408
14.	Seid seed enterprise	Amhara/Harbu	Seid Hussien	914609735
15.	Solomon Farm	Tigray/Alamata	Ato Solomon Ayalew	914314740
16.	Mulualem commercial farm	SNNP/Sodo	Ato Mulualem Mesene	911086111
17.	Tadesse farm	SNNP/Sodo	Ato Tadesse Mega	928833037
18.	Edget Farmers' Coop Union	SNNPR	Ato Tesema Alemayehu	913236341
19.	Hawassa University	Hawassa	Prof. Adugna Tolera	911721358
20.	Bahir Dar University	Bahir Dar	Dr. Matebe Tafere	918340163
21.	Bahir Dar University	Bahir Dar	Dr. Firew Tegegn	918782297
22.	EIAR	Debre Zeit	Dr. Diriba Geleti	923262786
23.	Eden Field Agri-seed	Addis Ababa	Ato Gebru Bongor	0930077382/0911424269
24.	Oromia Seed Enterprise	Addis Ababa	Ato Hunde Dubre	114160309/09113335703
25.	Oromiya Agricultural Research Institute (OARI)	Addis Ababa	Felekech Lemecha	011058916/0911391506
26.	Oromia Livestock and Fisheries Resource Development Bureau	Addis Ababa	Kuma Ebissa	0911477691/927441383
27.	Ethiopian Seed Enterprise	Addis Ababa	Dr. Tafesse Gebru	0911511553/0116630895
28.	Ethiopia Animal Feed Industry Association	Addis Ababa	Ato Yirdaw W/Semayat	911346749
29.	Ethiopian Institute of Agricultural Research (EIAR)	Addis Ababa	Dr. Getnet Asefa	913380858

30.	Agricultural Transformation Agency (ATA)	Addis Ababa	Dr. Workneh Ayalew	930000344
31.	ATA	Addis Ababa	Dr. Getachew Animut	913244514
32.	ATA	Addis Ababa	Ato Gizachew Sisay	115570778
33.	ATA	Addis Ababa	Ato Mersha Tesfa	911922877
34.	Ethiopian Standards Agency	Addis Ababa	Ato Yohannes Melese	912133103
35.	ILRI	Addis Ababa	Dr. Siboniso Moyo	0911230109/0116172000
36.	ILRI	Addis Ababa	Dr. Barry Shapiro	911397094
37.	ILRI	Addis Ababa	Dr. Getachew Gebru	911407999
38.	ILRI (Lives)	Addis Ababa	Dereje Legesse	116172000
39.	ILRI	Addis Ababa	Ato Teklu Kidane	910202833
40.	ILRI	Addis Ababa	Ato Asebe Abdena	911400137
41.	ILRI	Addis Aabba	Ato Peter Tefera	911223101
42.	International Center for Research in Agroforestry (ICRAF)	Addis Ababa	Nigussie Hagazi	0914749870/0116172491
43.	USDA FEED II project	Addis Ababa	Dr. Karl Birkelo	0911213390/0116620685
44.	USAID-AKLDP	Addis Ababa	Dr. Adrian Cullis	920341384
45.	USAID-AKLDP	Addis Ababa	Dr. Berhanu Admassu	911240002
46.	USAID Livestock Market Development (LMD)	Addis Ababa	Tesfaye Lemma	0913111778/0116450077
47.	GIZ/SLM	Addis Ababa	Dr. Georg Deichert	0920192013/0116629979
48.	CNFA	Addis Ababa	Jennk Bremn	
49.	Land O' Lakes	Addis Ababa	Dr. Gizaw Tadesse	0911704326
50.	FAO	Addis Ababa	Dr. Lemma Gizachew	911408432
51.	SNV	Addis Ababa	Mahlet Yohannes	0911732406/0111262100
52.	W/ro Hadiya M Gondji	Addis Ababa		0911-201230
53.	W/ro Zewditu Alemu	Finote Selam		0918-132674
54.	ILRI	Addis Ababa	Meron Mulatu	
55.	USAID-AKLDP	Addis Ababa	Dr. Eshetu Yimer	
56.	USAID-AKLDP	Addis Ababa	Tsion Fisseha	

Annex III: Draft Concept Note

Impacting livestock farmer livelihoods, food security, nutrition and natural resource management through sustainable forage and forage-seed industry

A Concept Note (DRAFT)

‘Feeding the Future’ population of Ethiopia through livestock development

As of 2013 there were about 11.4 million households involved in livestock production in Ethiopia (CSA, 2012). Meanwhile, based on analysis done by MOA and ILRI using the Livestock Sector Investment and Policy Toolkit (LSIPT), despite large numbers of animals held, about forty-nine percent (49%) of these livestock-keeping households (with about 28 million people) live below the Government of Ethiopia (GOE) established poverty line (MOA and ILRI, 2014). Furthermore, projections show that without significant immediate investments in improving animal productivity, the national-level production–consumption gaps for meat, milk and eggs in 2028 will be about 47 per cent, 27 per cent and 55 per cent, respectively (MOA and ILRI, 2014).

The livestock feed problem and forage-seed solution

For most livestock keepers, the inability to feed their animals adequately throughout the year is the most critical and widespread technical constraint to increasing animal productivity, and thus a key to achieving better livelihoods and food security and nutrition, as well as more sustainable use of natural resources. For better animal feeding to take place, more and better forage seeds need to be produced on-farm or grown commercially and sold through well-functioning markets. A major unaddressed gap is the availability and marketing of good-quality forage seed.

In spite of its significant contribution, the country's livestock productivity is low. In addition to animal health problems, lack of adequate quantity and quality of feed is a major factor in poor livestock productivity. According to 2010 Central Statistical Agency (CSA) information on feed usage, in rural areas of the country a very limited amount of improved feed is used by livestock holders. Animal feed shortage remains the main constraint on herd size and productivity in both the lowlands and highlands.

Current state of forage-seed production

Ethiopia's forage-seed production and marketing is generally informal and mainly dominated by informal seed dealers and farmer-to-farmer exchanges. The concept of direct seed marketing is unfamiliar and currently not exercised. The main limitations of the forage-seed industry also include a shortage of public- and private-sector expertise. Poor coordination among seed producers, extension service providers, and other market actors limits the viability of the value chain. Very few actors play a role in developing the forage-seed value chain in Ethiopia. The current forage-seed system in Ethiopia is underdeveloped. Variety release, quality control and seed certification and standards are unclear and scattered, with limited to no traceability.

ILRI holds in trust a major collection of forage-seed diversity, which has led to identification of 60 best-bet feed solutions. The use of this genetic resource has been growing, but it is far from adequately used. Lack of a market-driven forage-seed industry is a key limiting factor to more and better-quality seed being produced and

marketed. The pilot FeedSeed project implemented by GIZ and ILRI showcased that there is potential to engage farmers, cooperatives and commercial farmers in the production and marketing of improved forage seed. Over the last two years, this project managed to recruit, train and engage 30 enterprises in the seed business. Before the start of the project, there was only one profitable seed company producing forage seed in Ethiopia. One of the critical constraints to developing a sustainable seed industry is dependency created by development projects and government agencies which give away or highly subsidize forage seed and feed. Proof of demand and willingness to pay for seed and feed, however, is provided by the experiences of many innovative farmers who produce and sell better seed and feed (USAID EDDP, 2011).

Objectives of the Concept Note

The International Livestock Research Institute (ILRI), the Agricultural Transformation Agency (ATA), Ministry of Livestock and Fisheries, Ethiopian Institute of Agricultural Research (EIAR), the Ethiopian Seed Enterprise (ESE), GIZ–Capacity Development (CD–seed) & Sustainable Land Management (SLM), USDA–FEED II project and USAID Feed the Future AKLDP project/Tufts university as partners propose to implement a large-scale forage and forage-seed business development project using a multistakeholder engagement approach to support the creation of well-functioning seed and feed industries. These partnership activities are complementary and linked to increase impact on more farmers, while knowledge gained about market-based innovation systems are being studied and shared by research for development (R4D) partners. As well, experience from other countries (e.g. India, Kenya) supports the approach used of public provision of technical and business training and mentoring to develop seed companies which can produce, process, market and sell forage seed at a profit.

To trigger the development of a sustainable commercial seed and feed industry, the partnering institutions identified the following key issues as areas of concern. It is planned to convene a national consultative meeting that further discusses these and other related issues. Based on the feedback of the national consultative workshop, it is then envisaged to develop a full-fledged project proposal that can be submitted to potential agencies for funding.

Key areas of concern

- Understanding the demand for forage seed by tailoring it to farmers' ability to pay.
- Studying the existing forage-seed supply situation and finding ways of boosting it to meet future demands. There is a general understanding that there is a wide gap between the supply and demand for quality seed and the trend is expected to increase.
- Development and implementation of forage and forage-seed policy, strategy and enhancing the capacity of institutions that implement the strategy, including the extension system which is necessary to put forages into use.
- Undertaking value-chain analysis and mapping of the input–output relationships and understanding all economic activities linked to the livestock sector, with a major emphasis on the dairy and meat subsectors which drive the demand for forage and forage seed.

- Creating a sustainable forage and forage-seed industry, including vegetative means of growing forages from stem cuttings and root splits.
- Ensuring a well-functioning seed variety release procedure, including implementation and financing of the system.
- Reviving the forage-seed certification system at the federal and regional levels.
- Developing a 'Quality Declared Seed' (QDS) system for the forage-seed industry based on the experience gained from ATA's QDS system for food crops.
- Availability of forage species and varieties to be used at a larger scale. The use of ILRI's germplasms with proper extension service, training and promotion is needed to reach out to the majority of smallholder farmers.
- Expanding the diversity and use of forages for multiple purposes such as for sustainable land management, natural resource management and crop–livestock integration (e.g. apiculture integrated into pollination-dependent industrial and food crops).
- Undertaking continuous research to increase the number of improved forage varieties with better impact on livestock productivity, land management and crop–livestock integration.
- While developing the forage-seed sector to meet long-term objectives, there is also a need to think of interim solutions – such as the possibility of importing seed and, whenever possible, exporting it too.

Approach

- The program would play a facilitative and light-touch approach to maximize capacity building and sustainability. Most of the additional program activities would be implemented through partners, who would hold a fair share of the program responsibility and commitment (by directly carrying out most of the activities and by providing in-kind contributions for their own activities and those of their local partners). The program activities will be implemented based on public–private partnership principles.
- The partnership can be in two forms: strategic and operational. Strategic partnerships are required to overcome challenges related to funding for scaling-out program activities and to shape an enabling environment (e.g. certification procedures by the public sector). The operational partners are partners who help in the actual implementation of program activities based on their own priorities and resource base. In some cases, strategic partners can also be implementing partners. The partnership approach will be used both at the federal and regional levels. There will be a national advisory committee to provide oversight of the overall program implementation in all regional states.

- The entire program implementation shall be based on a pre-developed strategy (roadmap).
- To sustain the forage and seed industry, there will be a public agribusiness incubator institution. The incubator provides technical and business development services to existing and upcoming new business start-ups.
- There will be a regular progress reporting system by and between partners.
- All measurable impacts shall be compared to baseline information, which should be collected prior to actual program intervention.

The intended results (to be discussed)

Implementation of a wide-scale forage and seed program in Ethiopia is expected to realize economic and environmental benefits. The economic benefit will enable livestock keepers to feed their animals with improved varieties of forages, leading to more and better livestock productivity. The environmental benefit of forage includes protection from soil erosion, improvement of soil fertility and reducing the level of livestock's methane emission. Use of forage crops to address feed shortages could reduce the pressure on natural pastures, improve erosion on marginal lands, increase carbon sequestration to mitigate climate change, support system sustainability, and enhance natural assets and system resilience as part of sustainable land management strategies. The specific indicators include:

- A well-functioning and sustainable forage and forage-seed industry
- A well-functioning forage-seed system, with the public and private goods elements working together effectively (public-private partnership)
- A well-functioning forage-seed certification procedure at the federal and regional levels
- Number of seed business entrepreneurs trained over five (5) years
- Number of successful and sustainable seed enterprises established and profitable in five (5) years
- Number of poor livestock keepers trained and involved in seed and forage production and feeding their livestock better
- Number of farmers buying seed
- Number of livestock-keeping household members (at five [5] members per household on average) benefiting nutritionally through increased consumption per annum of meat and/or dairy products

- Number of SLM/NRM project sites successfully integrating multipurpose forage species with effective management practices to also serve as feed bases
- Large-scale commercial fodder production established, supported by effective seed import and quarantine protocols
- The major focus of the expanded project would still be on developing viable seed agribusinesses in the public and private sectors through training, mentoring and financial 'handholding' (in order to help get loans and/or grants), but more emphasis would be on farmers building seed businesses, and especially on empowering women and improving their livelihoods and/or income.

Additional seed production and impacts

- At the end of the project, the total amount of forage seed produced (in tons) per year by farmers, through new business clients and partners, would be measured to see the impact
- By the end of the project, enough better-quality seed would be grown by private businesses, including through contracted farmers, and would be sold to seed purchasing farmers to produce adequate forage to close the production–consumption gaps for meat, milk and eggs
- The livelihoods and nutritional status of farmers and their families would be substantially improved
- A publically financed agribusiness incubator would be backstopped and capacitated to train and mentor new forage-seed businesses, and also would be fully equipped with pilot-scale seed-processing equipment for training purposes

Expanded policy activities

- By the end of the program, development partners and government partners will buy seed from the seed enterprises created, reducing the subsidies on forage seed and feed over the program life
- A matching grant fund would be established to assist potential seed business entrepreneurs to purchase the seed-processing equipment needed to build viable businesses
- The relevant GOE and six (6) regional state agencies would be assisted to establish land-use policies and implement programs to enable large-scale seed and forage production
- The relevant GOE and six (6) regional state agencies would be assisted to establish and implement seed certification programs

Lesson learning and sharing

- Lessons learned from the program would be recorded on time using a proper M&E system. Lessons on the range of seed-system strategies employed would be

compared and shared to determine which models work, where and why. All measurable impacts would consider the baseline information to be collected before the start of the program.

Resources required to achieve expanded impact

- It is essential to establish a project office staffed with competent and qualified people to implement the program. The most important staff positions include program leader, forage-seed technologies expert, agribusiness adviser, marketing expert, M&E expert and finance manager. Additional support staff members are also needed to undertake day-to-day tasks. The staff number could range between eight (8) and ten (10).
- A total budget of US\$ === is needed to achieve the expanded results and impacts outlined above over a period of five (5) years.

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