



# Commercialization of Forage Seed Business in Mixed Farming Systems of the Highlands of Ethiopia

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## **The Context**

The livestock sector is both the culprit and the victim of climate change (Thornton et al., 2009). A significant amount of emission from the agricultural sector is known to come from the livestock sector, especially from industrial-level livestock production systems. The livestock system is also a victim of climate change as slow onset as well as extreme weather events such as heat stress and drought create havoc on livestock populations and threaten the livelihood of millions of smallholder livestock farmers around the world (Thornton et al., 2009). Hence, sustainable intensification of smallholder livestock systems has the potential to contribute towards the triple wins of climate-smart agriculture, namely increasing productivity, improving resilience, and reducing greenhouse gas emissions (Campbell et al., 2014).

In Ethiopia, the majority of the basal feed for livestock comes from crop residue and natural pasture including hay (Fekede Feyissa et al., 2015). While the role of concentrate feed is increasing, their price and accessibility remain a major challenge. Crop residue and natural pasture are often poor in their nutritional value. Hence, forage crops remain the major untapped source of protein and energy that could complement existing feeding practices (Fekede Feyissa et al., 2015; Mekonnen et al., 2022).

The use of forage crops in the Ethiopian livestock system is on the rise. However, their diffusion and adoption remain low. While there are various intricate reasons behind the wide diffusion and adoption of forage innovations, one of the key constraints is the weak forage seed system (Fekede Feyissa et al., 2015; Mekonnen et al., 2022). Forage remains largely an item of 'free handout' by government and non-government actors, leaving limited space for market-based interventions. Limited early-generation seed supply from research institutes, poor commercial certified seed production, a nearly fully subsidized forage seed market, and extremely expensive price quotations among others are typical characteristics of the forage seed sector.

On September 23, 2023, the core innovation of the Mixed Farming System initiative in collaboration with the Sustainable Animal Productivity for Livelihoods, Nutrition, and Gender Inclusion initiative brought together key scaling partners to identify key bottlenecks to achieve the scaling ambition of the innovation and determine innovation readiness and innovation use levels. This brief presents the findings of the innovation packing workshop.

## **The innovation and rationale for mixed farming system consideration**

The Africa RISING Ethiopian Highlands project, a predecessor to the Mixed Farming System Initiative, validated and promoted various feed and forage options. The limiting factor for wider diffusion and adoption has been the limited supply of forages and forage seeds. In this activity, we are planning to test various integrated commercialization models that would benefit livestock farmers and other actors along the forage seed system value chain. The commercialization model that we are



testing includes an integration of land clustering, contractual agreement with forage seed companies, formal field inspection and cost-benefit analysis. Commercialization of forage seed production in the mixed farming system is a major challenge as it requires the collaboration of multiple stakeholders and management of trade-offs and synergies between crop vs forage production. Forage and crop production compete within the limited available land of smallholder farmers.



*Million Gebreyes/ILRI/ demonstrating fodder beet chopping at a farmer's field day in Debre Birhan*

### **Setting Scaling Ambition**

The core innovation team set the scaling ambition of by 2028 the Mixed Farming Initiative and partners will work together with Regional and Zonal Livestock Development Offices, NARS, Forage Seed Producer and other forage seed value chain actors to accomplish the use of commercial forage seed business by 20,000 livestock farmers, 8 researchers, 100 extension agents, 17 district/zonal/regional/federal decision-makers, 8 community-based organizations and three small and medium enterprises to contribute achieving END-OF-INITIATIVE-OUTCOME transitioning towards sustainable intensification of mixed farming systems. The scaling ambition is set taking into consideration the number of regions that the Mixed Farming System initiative is operating currently, estimating the number of farmers and other actors that will be engaged in the business model development and the final users of the forage seed produced.

## Identifying key bottlenecks for scaling

Participants were asked to take individual time to write 3-5 postcards of barriers to scaling the innovation and commercialization of the forage seed business in Ethiopia. Then the contributions of participants were clustered around the eight enabler categories pre-identified for the workshop. Some of the categories received more responses than others (Table 1). For example, after removing the repetitive responses, the enabler categories user awareness, user capacity, and legal conditions received the top responses, indicating the consensus over these barriers.

Table 1: Key bottlenecks for scaling of the core innovation

Enabler category	Number of responses	Key barriers identified
Beneficiary/user access to finance/affordability of the core innovation	5	<ul style="list-style-type: none"> <li>- High forage price</li> <li>- Limited access to credit by farmers for forage seed production</li> <li>- Lack of alternative financing options</li> </ul>
Beneficiary/user awareness of the core innovation	20	<ul style="list-style-type: none"> <li>- Limited forage seed promotion by the extension system</li> <li>- Traditional livestock production system</li> <li>- Limited awareness by farmers on the importance of forages</li> <li>- Limited awareness by farmers on forage seed production</li> <li>- Absence of evidence base to convince farmers to shift to forage seed production</li> <li>- Farmers limited business skills to engage in commercial forage seed production</li> </ul>
Beneficiary/User confidence/trust in core innovation	9	<ul style="list-style-type: none"> <li>- Poor seed quality and traceability</li> <li>- Absence of quality assurance mechanism</li> <li>- Production limited to small-scale or backyard farming, limited large-scale production</li> </ul>
Availability and beneficiary/user access to the core innovation	4	<ul style="list-style-type: none"> <li>- Limited access to early-generation seed</li> <li>- Limited access to certified seeds</li> </ul>
Compatibility of the core innovation with existing farming/market/policy systems or business models	10	<ul style="list-style-type: none"> <li>- Absence of market linkage</li> <li>- Weak market orientation of the livestock system</li> <li>- Limited effort in linking forage development with livestock production</li> <li>- Limited knowledge on forage seed demand</li> <li>- Competition for land with crop and crop seed production</li> </ul>
Beneficiary /user capacity and knowhow to appropriately use the core innovation	13	<ul style="list-style-type: none"> <li>- Inadequate knowledge of development agents on forage innovations</li> <li>- Limited forage seed production skills at all levels</li> <li>- Limited forage seed value chain knowledge</li> <li>- Weak forage seed market infrastructure</li> <li>- Limited awareness and interest of seed producing enterprises for forage seed</li> </ul>
Stakeholder coordination and scaling partnerships	2	<ul style="list-style-type: none"> <li>- Weak coordination among actors</li> <li>- Lack of public-private partnership</li> </ul>
Legal conditions and governance required to scale core innovation	13	<ul style="list-style-type: none"> <li>- Lack of incentive for forage seed producers, such as access to land capital or capital exemption</li> <li>- Land shortage in highland areas</li> <li>- Access to land</li> <li>- Government priority for food crops</li> <li>- Absence of certified forage seed producer cooperatives and unions</li> </ul>

Enabler category	Number of responses	Key barriers identified
		<ul style="list-style-type: none"> <li>- Free handout of forage seeds by gov't and NGOs</li> <li>- Limited policy focus on forage seeds</li> </ul>

## From key bottlenecks to key enablers

The workshop participants were further asked to pick one key bottleneck from each of the enabler category and suggest a solution to scale the core innovation, turning them to complementary innovation needed to scale the core innovation. Each of the complementary innovation was then assessed on its innovation readiness and innovation use. Innovation readiness refers to the development stage of an innovation and how ready it is for scaling, measured along 9 levels of readiness. Innovation use on the other hand represents the extent to which an innovation is already being used in society and by whom., which is also measured along 9 levels of use (<https://hdl.handle.net/10568/106632>). The two scales reveals context-specific bottlenecks/ levers (law-of-minimum), which could informs scaling strategy design and strategic partnerships to lift bottlenecks (See table 2).

Table 2: Complementary Innovations, innovation readiness and innovation use

Title	Description	Innovation Readiness	Innovation Use
Commercialization of forage seed business	Institutional and business models for scaling and commercialization of forages and forage seeds in mixed farming systems in Ethiopian Highlands	6	2
Forage seed coordination mechanism	Effective forage seed coordination mechanism to improve forage seed supply for smallholder farmers	2	2
Law enforcement for forage seed production	Enforce seed production certification mechanisms to improve supply of quality seed and enhance farmers confidence on forage seeds	7	6
Establish early generation forage seed platform	Establishing a forage EGS platform for improved linkage among actors and demand-based supply	0	0
Improve forage seed production skills at all levels	Forage seed production capacity development to improve the skills and capacities of farmers, extension agents, and seed enterprises	2	6
Improve the effectiveness of the seed certification system	Implementation of an effective seed certification system for the availability of quality forage seed to farmers	7	5
Operationalize livestock extension strategy	Improve livestock extension system by operationalizing livestock extension through the engagement of extension experts at all levels including end users such as farmers	4	1
Forage seed market development	Market-based approaches for forage seed supply to ensure affordability and sustainable supply	6	2
Forage seed production cost-benefit analysis tool	Develop a cost-benefit analysis tool to support policy decisions and enhance farmers' confidence in forage seed production	0	0

## Discussion and conclusion

The findings in Table 2 reveal important insight that could help design a scaling strategy. For example, EGS coordination platform and cost-benefit analysis tool for forage seed producers were identified as essential complementary innovations necessary to commercialize the forage seed business in Ethiopian highlands. However, these two innovations are not yet available in the forage seed system. Also, seed production coordination mechanisms and capacity development mechanisms for all actors along the forage value chain scored lower readiness scores. With the low minimum in mind, scaling of the core innovation is dictated by not all the complementary innovations, but by those innovations with the lowest score, addressing limitations around the complementary innovation with the lowest innovation readiness and use needs to be an essential element of the scaling strategy of the core innovation. On the other hand, the complementary innovations with the highest scores, such as the certification system for forage seeds only require operationalizing the standards for crop seed certification to forage seed certification. In the scaling strategy, the innovations with the higher score could make the low-hanging fruits that the scaling strategy could set as quick wins.

Overall, participants in the innovation packaging workshop appreciated the design of the workshop, which was intensive but engaging. The diversity of participants ranging from the private sector, public sector, seed producers, regulators, research and civil society was also appreciated.

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