CGIAR SUSTAINABLE FARMING

INNOVATION PACKAGING AND SCALING READINESS REPORT

Localized Agronomy and Fertilizer Advisory Solutions in Ethiopia

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Contents

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Harmonized and Localized Agronomy and Fertilizer Advisory Solutions (LAFA)

LAFA is a digital advisory tool that unifies Landscape-based Fertilizer Advisory (LANDWise) and NextGen into one harmonized digital solution called Localized Agronomy and Fertilizer Advisory (LAFA) to deliver precise, site-specific fertilizer and agronomic recommendations using accessible delivery channels. It addresses the challenges of generic fertilizer advice, suboptimal nutrient use, climate vulnerability, and digital service disparity. It integrates multiple tools and datasets into one harmonized platform, giving farmers timely and accurate guidance on how much fertilizer to apply, when, and where.

Ambition

The harmonized Agronomy and Fertilizer Advisory Solutions (LAFA) is a demand-driven solution responding to local and national needs. It demonstrated a validated effectiveness in increasing yields and farmer profits. It has a proven track record of optimal return on investment, with net profits of $10.0, $12, and $30 for teff, wheat, and sorghum, alongside improved Nutrient Use Efficiency from 32% to 45%. The innovation has strong alignment with Ethiopia's Digital Agriculture Roadmap 2032 signals robust governmental demand and addresses critical gaps to meet demands for precise, localized agronomic advice. In the long term, it aims to achieve full Scaling Ambition targets to reach 6.85 million farmers (50% of fertilizer users for cereals), including 2.05 million women and 2.74 million youth, boosting national cereal production from 31.6 million to 140 million metric tons.

Introduction

Fertilizer use has long been a cornerstone of global agricultural intensification. However, blanket fertilizer recommendations that overlook variation in soils, topography, moisture, and crop responses often produce suboptimal outcomes, including low agronomic efficiency, nutrient losses, environmental degradation, and uneven economic returns across fields (Desta et al., 2025). Yield gaps persist due to declining soil fertility, generalized fertilizer recommendations, and limited access to tailored advisory services (CGIAR, Data-Driven Fertilizer Optimization). Even when fertilizer adoption has increased, efficiency and profitability have remained low, largely because “one-size-fits-all” approaches fail to reflect strong within-field and landscape variability. To address these challenges, more precise and context-sensitive fertilizer management is urgently needed. More recently, data-driven and machine learning–enhanced recommendations for wheat, teff, maize, and sorghum have delivered higher yields and greater resource-use efficiency compared with blanket recommendations in multi-location trials (Alliance of Bioversity International & CIAT, 2024). Despite these promising results, scaling remains constrained by several barriers: (a) variability in piloting and scaling performance, (b) limited institutional capacity to maintain and update advisory, (c) affordability and accessibility challenges for resource-poor farmers; and (d) gaps in inclusion of women and youth, both as users and service providers. Addressing these requires an integrated scaling strategy that combines robust piloting and scaling, inclusive delivery channels (public, private, and digital), capacity development, and policy alignment.

Innovation package assessment process

Innovation package design and scaling readiness assessment is a structured approach to designing innovative packages tailored to specific contexts. This process enables the identification of CGIAR synergies and external partnerships tailored to the specific context while tracking changes in innovation package readiness and use over time. First, scaling partners were identified from various institutes, including zonal and district agricultural offices, non-government partners, research institutes, universities, and cooperative unions. In the preparation phase, the innovation package design workshop is initiated by gathering the essential information required for the workshop. This entails describing the core innovation, ensuring the participation of key scaling partners, and determining the context of the package and scaling ambition. For the design of innovation packages, participants are grouped into seven groups based on the representation of seven zone administrations (Hadiya, Kembata, Silte, Wolaita, Jimma, North Shewa, and Central Gondar) in the Central, South Ethiopia, Amhara, and Oromia regions. The design step of the process involves the identification of challenges and bottlenecks for scaling, development, and curation of scaling enablers per group. These enablers can be existing or new, but are critical for scaling the core innovation in the selected context and are ranked according to their perceived importance. Finally, the innovation packages are assessed for their readiness to scale and use using the IPSR framework. The workshop involves 40 participants.

Innovation package

Workshop participants identified and prioritized nine innovation packages covering critical enablers, technology, and practices needed to achieve the scaling ambition. Among the enablers, commitments at the local level, increased price of fertilizer, and poor access to inputs are given the highest priority to influence the innovation scaling. Despite there is a well-structured public extension system and supporting services as well as non-government partners, enablers on technical capacity and logistic support services remain constraints for scaling. While gaps in technological and sociotechnical innovations and digital infrastructures still have a relative influence on the innovation scaling, scaling partners' coordination is found encouraging and should be strengthened with public and private partnership incentives. The table below provides innovation packages and their description, along with key constraints for scaling.

Table 1. Innovation packages and their descriptions were assessed by scaling partners to tackle the constraints for scaling

SN	Constraints	Innovation package and description	Core/Enabler
1	Suboptimal nutrient management for site and crop-specific nutrient application advice under contrasting biophysical contexts and demands	**Harmonized and Localized Agronomy and Fertilizer Advisory Solutions (LAFA):** It is a core innovation to deliver precise, site-specific fertilizer and agronomic recommendations using accessible delivery channels.	Core
2	Increasing fertilizer prices and a lack of credit services	**Access to finance and alternative investment options**: Providing credit access from microfinance, RUSACOOs, and Unions, and access to land collateral loans. Encouraging the use of organic fertilizers and ISFM practices. Increase farmers' bargaining capacity for grain prices. Government investment in domestic fertilizer production	Enabler
3	Inadequate access to inputs and poor packaging, and delivery services	**Input access and delivery services**: Balancing the supply and demand of fertilizer and other inputs by encouraging agrodealers, cooperatives, and unions for fast-track local input supply and on-time distribution, and facilitating local seed and input supply business. Packaging of inputs/fertilizer as per local demands by supplying different small packaging options (25kg,30kg, etc)	Enabler
4	Low technical capacity and awareness)	**Capacity building**: Catalyzing need-based skill training, awareness workshops, experience sharing, and peer learning, as well as preparing technical guidelines and brochures with collaborative support from NARS and NGO partners	Enabler
5	Lack of commitment at all levels (leadership, extension agents, stakeholders) and lack of coordination within the institution	**Ensuring commitments and visioning**: Creating vision, common understanding & awareness. Establishing regular monitoring and follow-up and conducting feedback assessment, and implementing incentive mechanisms.	Attitude and Knowledge
6	Poor digital infrastructures (accuracy, accessibility, and network)	**Enabling IT access and digital services**: Collaborating with Telecom/Safaricom for their support in IT infrastructures, enabling access to land cadastral /parcel maps for tailored advisory services at the farmer/parcel level. Increasing access to digital/ IT technologies for end users. Enhance the digital literacy of users	Enabler
7	Limited financial resources and logistics (budget, fuel, transportation services, etc)	**Funding and supply of logistics**: Allocation and optimized use of budget for local operations (Zonal and district Level), and enhancing partnership with non-public stakeholders for coordination actions, and using low-cost transportation services (motorbikes)	Enabler
8	Outdated and fragmented agronomy technology packages	**Evidence on bundle of site-specific technologies:** Updating existing agronomic and complementary packages with site-specific technology packages; strengthening demonstrations at FTC and farmers' fields.	Technology

9	Lack of a system innovation package (complementary innovation)	**Ensuring sociotechnical services**: Packaging/bundling other sociotechnical technologies and services (mechanization, insurance, credit, seed, etc). Promoting social media and mass media-based extension services and working with partners who have complementary roles.	Practice
10	Poor coordination among partners for a common vision and actions	**Strengthening scaling platform**: Strengthening zonal and district coordination and creating partners networking platforms at all levels. Establishing regular monitoring frameworks, feedback collection mechanisms, and reporting systems, and facilitating field exchange and learning visits	Enabler

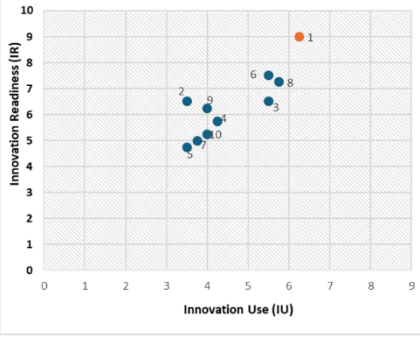
Scaling readiness assessment of the innovation package

The innovation package was assessed and evaluated by a mix of scaling partners from new piloting areas and scaling geographies over the last three years through a series of questions and discussions about the innovation's status and potential for scaling. The innovation package, including core innovation and stakeholders identified complementary technologies and enablers, was assessed for its readiness and level of use by assigning a score from 1 (initial idea or not used) to 9 (proven and widely used in real-world conditions) (Table 2).

Table 2: A description of the innovation readiness and innovation use level scales (CGIAR approach)

	Innovation Readiness		Innovation Use
0	The innovation is at idea stage	0	The innovation is not used
1	The innovation's basic principles are being researched for their ability to achieve a specific impact	1	The innovation is used by the organization(s) leading the innovation development
2	The innovation's key concepts are being formulated or designed	2	The innovation is used by some partners involved in the initial innovation development
3	The innovation's key concepts have been validated for their ability to achieve a specific impact	3	The innovation is commonly used by partners involved in the initial innovation development
4	The innovation is being tested for its ability to achieve a specific impact under fully controlled conditions	4	The innovation is used by some organizations connected to partners involved in the initial innovation development
5	The innovation is validated for its ability to achieve a specific impact under fully controlled conditions	5	The innovation is commonly used by organizations connected to partners involved in the initial innovation development
6	The innovation is being tested for its ability to achieve a specific impact under semi-controlled conditions	6	The innovation is used by organizations not connected to partners involved in the initial innovation development
7	The innovation is validated for its ability to achieve a specific impact under semi-controlled conditions	7	The innovation is commonly used by organizations not connected to partners involved in the initial innovation development
8	The innovation is being tested for its ability to achieve a specific impact under uncontrolled conditions	8	The innovation is used by some end-users or beneficiaries who were not involved in the initial innovation development
9	The innovation is validated for its ability to achieve a specific impact under uncontrolled conditions	9	The innovation is commonly used by end-users or beneficiaries who were not involved in the initial innovation development

The results revealed that the core innovation (#1: Harmonized and Localized agronomy and fertilizer advisory solution) obtained the highest readiness and use scores, followed by the complementary technologies and enablers (#8: Evidence on bundle of site-specific technologies and #6: Enabling IT access and digital services) (Fig. 1). The biggest constraints and challenges to scaling were thought to be commitment and visioning (#5) and lack of funds and inadequate logistics (#7), which had the lowest readiness/use level. Addressing these bottlenecks will require a strategic approach that fosters stronger commitment among stakeholders, establishes regular monitoring and follow-up, and secures adequate budget/funding. By enhancing the clarity of the vision and aligning resources, scaling partners can better facilitate the scaling process.



S/N	Inovation package	Innovation Readiness	Innovation Use
1	***Harmonized and Localized Agronomy and Fertilizer Advisory Solutions**	**9.0**	**6.3**
2	Access to finance and alternative investment options	**6.5**	**3.5**
3	Input access and delivery services	**6.5**	**5.5**
4	Capacity building	**5.8**	**4.3**
5	Ensuring commitments and visioning	**4.8**	**3.5**
6	Enabling IT access and digital services	**7.5**	**5.5**
7	Funding and supply of logistics	**5.0**	**3.8**
8	Evidence on bundle of site-specific technologies	**7.3**	**5.8**
9	Ensuring sociotechnical services	**6.3**	**4.0**
10	Strengthening scaling platform	**5.3**	**4.0**

Figure 1. Innovation package assessment using the Innovation Readiness and Innovation Use Scale.

Lessons

1. Workshop participants discussed the limitations of the national agronomic package, which recommends DAP without urea application during planting time. There is a concern that crop growth is not vigour without the application of urea at planting. Two split applications of urea have been recommended, one twenty-one days after planting and the other thirty-four days after planting, while the site-specific application suggests one-third at planting and two-thirds for topdressing. This discrepancy needs to be refined by the research system.
2. In the advance of site-specific nutrient recommendations, local-level extension agents and practitioners anticipated cascaded extension services to provide a digitally enabled crop and site-specific agronomy packages.
3. Innovation packaging is still focusing on soil and agronomic technologies, while other innovations on pest management, mechanization, post-harvest management, input delivery, and financial access have received less emphasis in the bundling efforts.
4. Financial shortage and inadequate logistic access to government institutions hamper the scaling of the core innovation. On the other hand, non-government partners such as NGOs, universities, and cooperatives have complementary capacity to catalyze and invest in scaling of innovations along with their project operations.

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Innovation Package, Scaling Readiness, Ethiopia

Partners

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About CGIAR Sustainable Farming Science Program

The CGIAR Sustainable Farming Science Program will address key challenges in agrifood systems by fostering efficient production of nutritious foods and safeguarding the environment to create fair employment opportunities, as we simultaneously tackle climate change, soil degradation, pests, diseases, and desertification.

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