SCALING SMART: ACCELERATING DIGITAL AGRONOMIC ADVISORY FOR RWANDA'S FARMERS THROUGH THE SNS FERTILIZER RECOMMENDATION TOOL. A SYNTHESIS REPORT OF THE SCALING STRATEGY DEVELOPMENT

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2025

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Scaling Smart: Accelerating Digital Agronomic Advisory for Rwanda's Farmers through the SNS Fertilizer Recommendation Tool. A synthesis report of the scaling strategy development

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EXECUTIVE SUMMARY

Background

The Smart Nkunganire System (SNS) Fertilizer Recommendation Tool project is an innovative approach designed to enhance agricultural productivity among Rwandan farmers by providing them with precise, data-driven fertilizer recommendations tailored to their specific location, soil and crop conditions. By optimizing fertilizer use, the tool aims to increase crop yields, reduce environmental impact, and support decision-making among smallholder farmers. The project included training and collaboration with stakeholders to ensure effective implementation and widespread adoption of the site-specific and tailored fertilizer, ultimately promoting resource use efficiency, sustainable farming practices and empowering farmers with actionable insights.

Under the funding of the Ukama Ustawi Scaling Fund, the project made significant progress, achieving key milestones in innovation packaging, responsible scaling, and scaling strategy development. Notably, all team members were trained in foundational concepts on scaling readiness and GenderUP, with three members further enhancing their expertise through specialized workshops. Four work areas were developed, and a competent team comprising members of different expertise within the CGIAR (CIP, ILRI, IITA and CGIAR systems office), Rwanda Agriculture and Animal Resources Board (RAB) and One Acre Fund (OAF) formed the scaling team to co-develop the scaling strategy (See annex I).

Highlights of the achievements:

- **Innovation packaging:** Identification of barriers and enablers to scale through Innovation packaging and Scaling Readiness (IPSR) workshop held on April 30th in Kigali, which gathered 27 participants from 13 organizations.
- **Workstream development:** Five workstreams were derived from the IPSR workshop and were used as a guide to data gathering for the development of the scaling strategy. For each of the workstreams a detailed report is published for detailed narration of methodologies, insights, achievements and highlights towards the scaling strategy:
    1. User experience,
    2. Public and private business models,
    3. Fertilizer value chain analysis,
    4. Awareness and capacity strengthening
    5. Scaling strategy development and resource mobilization.
- **Partnership building:** High-level engagement with key stakeholders to address the identified bottlenecks including RAB management, RAB Agricultural Inputs Subsidies unit, BKTechouse, Imbaraga, Meda, and One Acre Fund (OAF) which resulted in a commitment to support the development of the scaling strategy and the innovation scaling phase.
- **Interdisciplinary collaboration:** A collaboration with the Excellence in Agronomy (EiA) Monitoring, Evaluation, Learning and Impact Analysis (MELIA) team was established which resulted in joint efforts in piloting the product. Furthermore, a joint write shop was conducted in a collaboration between different CGIAR centres, RAB, EiA and Ukama Ustawi staff.
- **Communication of findings:** Media coverage through various media houses, X(Twitter), LinkedIn and CGIAR news spaces of the IPSR workshop and core innovation further amplified the project's visibility.

- **Capacity building across the partnerships:**
  - The SNS curriculum was updated in collaboration with BKTechouse and the RAB input and subsidy unit and materials were printed and distributed to all the 30 districts in Rwanda.
  - A total of 67 Master trainers were trained in accessing, using and troubleshooting within the SNS system as well as on the new fertilizer recommendations.
  - Trained 100 farmer promoters using the training of trainers model on the SNS-FRT, who in turn trained an additional 7,500 farmers in two districts.
  - Printed 4,000 leaflets with GAP and Fertilizer recommendation information translated to Kinyarwanda for distribution and training purposes.
- **The scaling strategy:** A completed draft scaling strategy outlining a clear roadmap for expanding the reach of the SNS-FRT across Rwanda. It integrates evidence-based approaches, stakeholder engagement, and adaptive learning to ensure a sustainable impact. It highlights key partnerships with public and private sectors, advancing collaboration for efficient resource mobilization. Using feedback from the piloting phase, the draft also incorporates feedback from field pilots, ensuring it is grounded in practical experiences and local contexts.
- With all these milestones achieved, we are well-positioned to advance the strategy towards implementation and broader adoption.

Key lessons learnt

Empowerment through training in scaling techniques and GESI: Training of the scaling team members in scaling techniques and Gender Equality and Social Inclusion (GESI) principles proved to be transformative. It equipped participants with practical tools to identify scaling opportunities, address gender and social barriers, and implement inclusive strategies. This capacity building not only strengthened the technical competency of trainers and farmer promoters but also ensured that scaling efforts are more equitable, sustainable, and responsive to diverse community needs.

There is huge value in inclusive stakeholder engagement: The project's success and achievements were possible through inclusivity. The IPSR workshop's success, which involved 27 participants from 13 organizations, highlighted the importance of engaging diverse stakeholders early in the scaling process. This broad participation facilitated the identification of both barriers and enablers to scale, emphasizing that inclusive collaboration fosters shared ownership and commitment to the scaling strategy.

Structured workstreams enhance focus and efficiency: Developing five distinct workstreams (user experience, business models, value chain analysis, capacity building, and resource mobilization) provided a clear framework for data collection and strategic planning. This structured approach ensured that critical areas were thoroughly explored, leading to detailed, actionable insights that strengthened the scaling strategy.

Strategic partnerships drive commitment and collaborative resource mobilization: Engagements with key stakeholders such as CGIAR scaling for Impact team, RAB, BKTechouse, and One Acre Fund demonstrated that building strong partnerships not only helps address bottlenecks but also secures long-term commitments and resources essential for successful scaling.

Interdisciplinary collaboration strengthens innovation: The joint efforts between EiA's MELIA team, different expertise from CGIAR centers, and local partners highlighted the value of interdisciplinary collaboration. Combining diverse expertise led to more comprehensive piloting and enriched the scaling strategy with insights from different disciplines, improving its robustness and applicability.

Effective communication amplifies impact and visibility: Leveraging multiple communication channels, including media houses, social media platforms, and CGIAR news spaces, significantly increased the project's visibility. This demonstrated that proactive communication not only raises awareness but also attracts additional support and interest from broader audiences, which is critical for scaling innovations.

Flexible funding mechanisms: Allow for adaptive responses to real and emerging needs. Rigid funding structures can limit the ability to address unforeseen challenges, whereas agile financial planning ensures resources are allocated where they are most impactful.

Regular check-in meetings with stakeholders and scaling team: Proved essential in identifying gaps, refining strategies, and ensuring alignment with evolving priorities. This iterative approach enhances responsiveness, accountability, and overall program effectiveness.

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ABBREVIATIONS AND ACRONYMS

BKTechouse	BK Techouse Ltd
CGIAR	Consultative Group on International Agricultural Research
CIP	International Potato Center
EiA	Excellence in Agronomy
FGD	Focus Group Discussion
FRT	Fertilizer Recommendation Tool
GESI	Gender Equality and Social Inclusion
HR	Human Resources
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
IPSR	Innovation Packaging and Scaling Readiness
KPI	Key Performance Indicator
MELIA	Monitoring, Evaluation, Learning, and Impact Analysis
MINAGRI	Ministry of Agriculture and Animal Resources
MOPA	Mobile Operations and Performance Application
MVP	Minimum Viable Product
NARS	National Agricultural Research Systems
OAF	One Acre Fund
PPP	Public-Private Partnership
RAB	Rwanda Agriculture and Animal Resources Development Board
RICA	Rwanda Inspectorate, Competition and Consumer Protection Authority
RwaSIS	Rwanda Soil Information System
SNS	Smart Nkunganire System
USSD	Unstructured Supplementary Service Data

ACKNOWLEDGEMENTS

1. PROJECT OVERVIEW

1.1 Rwanda SNS-FRT overall innovation goals and project intervention country

The core innovation delivers site-specific fertilizer recommendations for six priority crops in Rwanda (cassava, maize, wheat, potato, rice, and beans) integrated into the government-managed Smart Nkunganire System (SNS). This digital platform, developed through a strategic partnership between BKTechouse and the Rwanda Agriculture and Animal Resources Development Board (RAB), plays a critical role in streamlining Rwanda's agro-input supply chain while managing the agricultural subsidy scheme under the Ministry of Agriculture and Animal Resources (MINAGRI). With over 2.5 million farmers registered, the SNS utilizes USSD technology to ensure even farmers in remote areas can access agricultural inputs efficiently. By leveraging real-time data on farmers' locations, land sizes, and crop types, the system optimizes the distribution of subsidized inputs, ensuring equitable access and enhancing transparency in subsidy management. This digital transformation significantly reduces bottlenecks in input supply, improves accountability, and fosters a data-driven approach to managing Rwanda's agricultural sector.

To complement the government's efforts and ambitious target to digitize the agriculture sector in Rwanda, support was provided to develop fertilizer recommendations based on the expertise in CGIAR to conduct data-driven approaches in machine learning and artificial intelligence. The fertilizer recommendations were co-developed through a public-private partnership involving key stakeholders such as the CGIAR Excellence in Agronomy (EiA) initiative, MINAGRI, RAB, One Acre Fund (OAF), and BKTechouse. This collaboration enabled the design of tailored fertilizer recommendations based on specific soil, climatic, and crop requirements across different regions of Rwanda. These recommendations are continuously updated and maintained by RAB to reflect evolving agronomic insights, ensuring they remain relevant to changing environmental conditions and emerging agricultural challenges. The system not only supports farmers in making informed decisions about fertilizer use but also aids extension officers and policymakers in determining appropriate subsidy allocations based on data-driven insights. This dynamic feedback loop advances sustainable agricultural practices, promotes resource efficiency, and contributes to improved crop productivity and food security nationwide.

During the development and piloting phase, the project received a significant boost through funding from the CGIAR Initiative on Diversification in East and Southern Africa (Ukama Ustawi) to conduct an Innovation Packaging and Scaling Readiness (IPSR) process and develop a comprehensive scaling strategy. The Ukama Ustawi Scaling Fund aims to accelerate the adoption and scaling of climate-resilient agricultural innovations across East and Southern Africa, with a particular focus on diversifying smallholder farming systems. This support provided both the financial resources and technical guidance needed to enhance the scaling process, ensuring that the fertilizer recommendation innovation could be effectively expanded to reach more farmers. By prioritizing gender and social inclusion (GESI), the initiative also strengthened the project's capacity to address inequalities, ensuring that the benefits of the innovation are accessible to diverse groups, including women and marginalized communities. The additional funding has not only supported the refinement of the scaling strategy but also contributed to building institutional capacity, strengthening partnerships, and enhancing the project's overall impact on food security and livelihoods in Rwanda.

Initial piloting of the fertilizer recommendation system took place in Nyanza and Rubavu districts, providing a proof-of-concept that demonstrated the feasibility and impact of integrating agronomic advisories within the SNS. The successful pilot set the stage for nationwide scaling starting in 2025, with the system now accessible to all registered farmers across Rwanda. However, to ensure the effective adoption of these recommendations, further efforts are needed to enhance farmers' understanding of the system. This includes advocacy campaigns,

capacity building for extension service providers, and the development of user-friendly extension materials tailored to local contexts. Strengthening the capabilities of Rwanda's vast extension network comprising over 400 sector agronomists, 2,000 farmer facilitators, and more than 14,200 volunteer farmer promoters will be pivotal in supporting farmers, promoting best practices, and maximizing the system's impact on agricultural productivity, climate resilience, and sustainability (Figure 1).

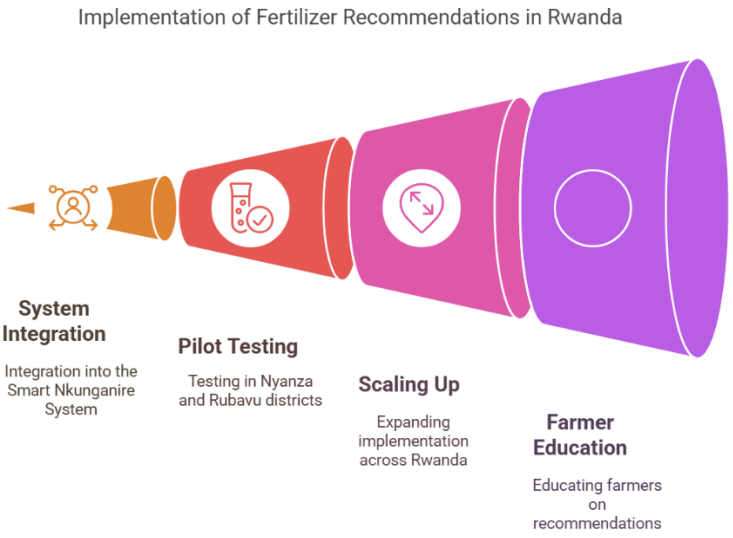


Figure 1: The scaling workflow of the Rwanda smart Nkunganire System fertilizer recommendation tool.

1.2 Goal of the project

The goal of the project was to enhance agricultural productivity, efficiency, and climate resilience in Rwanda by successfully scaling the adoption of site-specific fertilizer recommendations through the SNS. This was achieved by leveraging digital technologies, data-driven insights, and a robust extension network to ensure equitable access to tailored agronomic advisories. Additionally, the project sought to optimize input use, improve crop yields, and strengthen food security, while promoting GESI and supporting the sustainable management of Rwanda's agricultural subsidy scheme. Furthermore, the project established a comprehensive scaling strategy, creating a sustainable framework for the nationwide expansion of the innovation and paving the way for integrating other climate-resilient agricultural innovations to support the diversification and resilience of smallholder farming systems across Rwanda.

1.3 Scaling ambition as per the IPSR workshop process.

The scaling ambition was that the scaling team (Annex I) would work together with RAB, BKTechouse, One Acre Fund (OAF), and farmer cooperatives such as the Imbaraga to accomplish the use of the SNS-FRT for an initial two of the six priority crops, supported by at least 10 sector agronomists, 100 farmer facilitators and farmer promoters, and a total of 10,000 farmers in Rwanda contributing to achieving the end-of-initiative outcome for the Ukama Ustawi and EiA initiatives. To operationalize this ambition, an initial 10,000 farmers would be selected for the piloting phase of the scaling using standardized scientific methods. The piloting phase would prepare the roll-out to the over 1.5 million SNS-registered farmers. Thus, assuming a 20% adoption rate, at least 300,000 farmers would benefit from the fertilizer recommendation tool by the end of 2025.

1.4 Summarized Project Timeline

The project commenced in January 2024 with its official kick-off conducted by Ukama ustawi during the pause and reflect meeting in Ethiopia. This was followed by the receipt of funding in March. The initial key activity was the IPSR workshop in April which was followed by the engagement of key stakeholders identified during the IPSR workshop in May. The 'User experience' data was gathered in July, leading to piloting and training activities in August. In September, a user experience workshop and discussions around business models and the fertilizer value chain took place. The SNS curriculum was developed in October, followed by the launch of the Minimum Viable Product (MVP) within the government system and a write shop in November. December was a critical month, featuring the SNS Master Trainers workshop, the finalization of the scaling strategy, Science Week, and the project's close-out activities, ensuring comprehensive coverage of both technical and strategic objectives throughout the year (Figure 2).

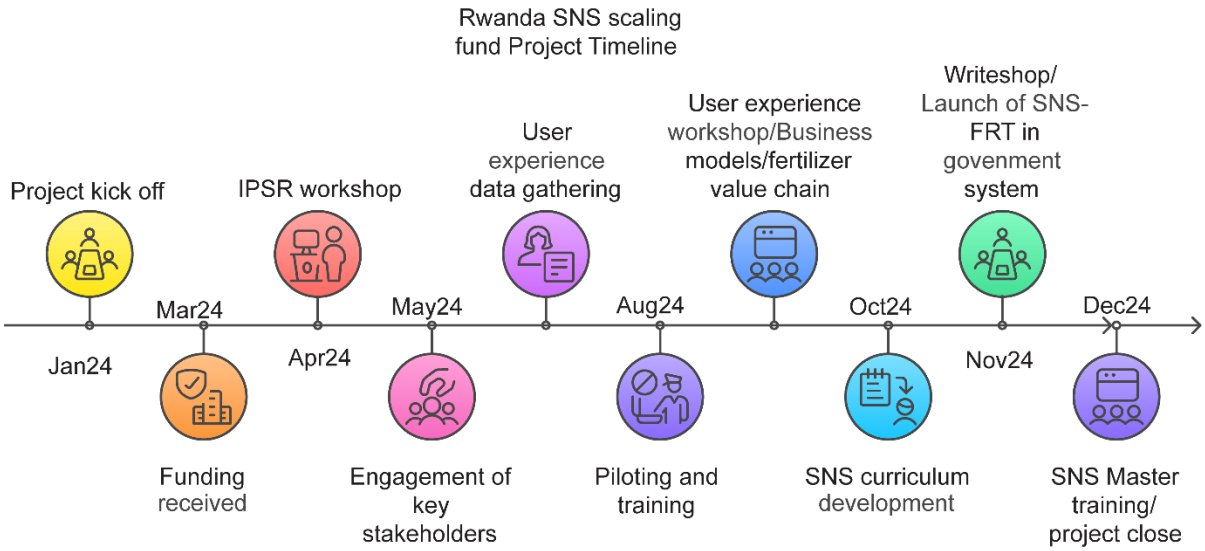


Figure 2: Summarized timeline for the project execution from January 2024 to December 2024.

1.5 Key project achievements

1.5.1 *Innovation Packaging and Scaling Readiness Workshop*

Table 1: Distribution of Innovation Package and Scaling Readiness (IPSR) workshop participants according to gender.

Type of participant	Female	Male	Total
Participants	5	12	17
Facilitators and organizers	4	6	10
Total	***9***	***18***	***27***

An Innovation Package and Scaling Readiness (IPSR) workshop was held on 30th April 2024, M-Hotel, Kigali. The IPSR workshop brought together a group of 27 experts comprising policymakers, extension officers, scientists, agro-dealers, farmer representatives, and digital scaling experts to analyze and improve the scaling potential of Rwanda SNS-FRT innovation. The workshop comprised 27 participants, with women making up 33% and men 67% of the attendees.

The workshop included presentations, discussions, and collaborative ideation sessions focused on analyzing challenges and barriers to scaling SNS-FRT, Identifying and evaluating specific interventions to address these challenges and prioritizing the next steps for enhancing the SNS tool's effectiveness and user experience (Figure

3). Participants delved into topics related to innovation packaging, identifying enablers and solutions, and assessing innovation readiness and use. Through group work and collective discussions, the workshop participants developed a comprehensive understanding of the system's status and future needs.

Figure 3: Rwanda Smart Nkunganire System Fertilizer Recommendation Tool (SNS-FRT) Innovation Package and Scaling Readiness (IPSR) workshop that was held on 30th April 2024, M-Hotel, Kigali. Workshop participants.

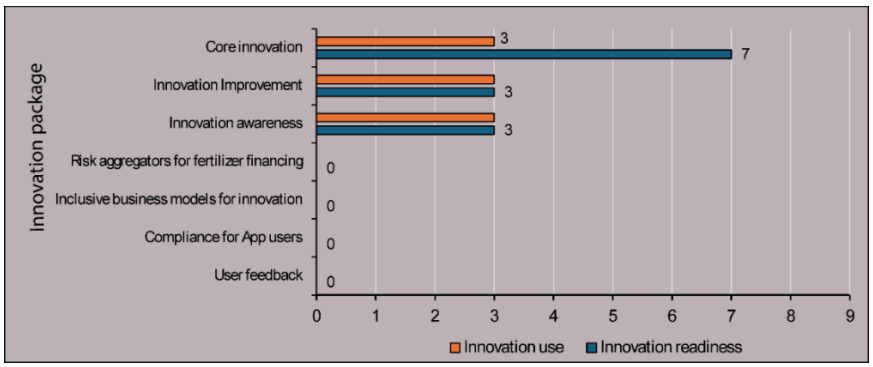


Figure 4: Innovation Package and Scaling Readiness (IPSR) workshop package innovation use and readiness scores.

Participants evaluated both core and complementary innovations to assess their readiness and practical use in scaling efforts in Rwanda (Figure 4). They provided evidence to support their assessments, which highlighted bottlenecks in the scaling process, especially among lower-scoring innovations (Figure 5). These insights guided strategic decisions on overcoming these bottlenecks, identifying key partners, determining the most effective collaboration methods, and planning necessary activities. Additionally, participants deliberated on enabling solutions, resulting in the development of advanced tools and methodologies to enhance the effectiveness of SNS-FRT. This comprehensive approach aimed to integrate various innovative technologies and complementary methods, ensuring that each component works synergistically to improve overall performance, facilitate adoption, and enhance the impact of SNS-FRT. The IPSR workshop was used as the backbone and guide to generate the workstreams used in the project implementation (Figure 5). Five workstreams derived from the workshop outputs were then used as a guide to data gathering for the development of the scaling strategy and initial project implementation strategies towards the scaling ambition. The work streams include: (i) User experience, (ii) Public and private business models, (ii) Fertilizer value chain analysis, (iv) Awareness and capacity strengthening and (v) Scaling strategy development and resource mobilization (Mudereri et al., 2024).

In brief, the objective of the user experience workstream was to identify challenges faced by users of the SNS-FRT platform and suggest improvements to enhance its user-friendliness (Rabourn et al., 2024). Additionally, research on potential public and private business models addressed the need for alternative funding mechanisms for the SNS, in case government support is unavailable (Sartas et al., 2024a). On the other hand, the fertilizer value chain analysis focused on identifying challenges from the importation of fertilizer to its delivery to farmers (Sartas et al., 2024b). Finally, the awareness and capacity strengthening workstream sought to enhance farmers' knowledge and identify the most effective information delivery methods suitable for Rwandan farmers (Ogunsanmi et al., 2024).

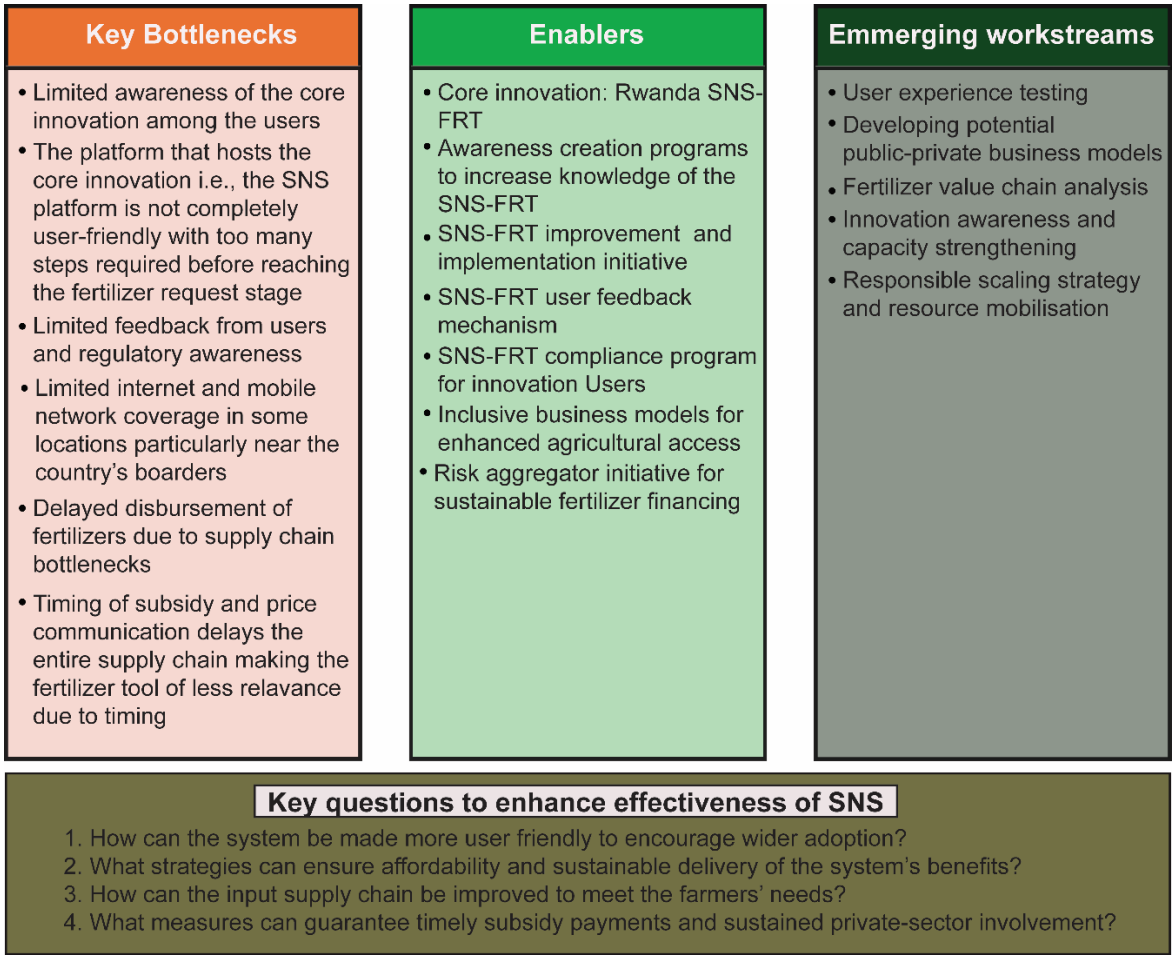


Figure 5: Summarized key bottlenecks and enablers outlined in the IPSR workshop and the workstreams identified for use in data gathering and development of the scaling strategy.

Figure 6: Meeting of CGIAR, OAF and RAB stakeholders.

1.5.2 *Engagements with key stakeholders and policymakers to address identified bottlenecks and gather more information*

The scaling team conducted four separate one-on-one meetings with OAF extension unit leaders, RAB SNS leaders, OAF, BKTechouse and several sector agronomists. Key discussions included the current use of SMS to train and motivate farmers, the goals of SNS to improve monitoring, reduce costs, and promote financial inclusion by leveraging farmer data for microfinance opportunities. Challenges were noted in the SNS's testing phase, with a significant bounce-back rate and low follow-through on input purchases. There was consensus on the need for a more customized SNS platform that considers gender parameters and limitations, crop types, and regional specifics. The team also discussed strategies to ensure adequate stock levels with agro-dealers and improve farmer engagement. Resolutions included working together to conduct targeted outreach programs, workshops for training on SNS functionalities, and securing a budget for SNS maintenance and capacity building. Follow-up actions involved scheduling other meetings and workshops to enhance the integration and user experience of SNS. The team also engaged with regional leaders in Nyanza, Huye, and Rubavu districts together with district and sector agronomists.

Figure 7: Focus Group Discussion on SNS use and challenges by farmers in Huye District.

1.5.3 *User experience focus group discussions and individual interviews*

Focus Group Discussions (FGDs) and individual interviews were conducted over four days in Nyanza, Huye, and Rubavu districts from the 16th to the 19th of July 2024 to assess the effectiveness, challenges, and opportunities of the SNS from the perspectives of farmers, farmer promoters, and cooperative leaders. A total of 103 people participated in the data-gathering exercise with 61 participants being from Rubavu, while 42 were from Nyanza. The participants included 95 farmer promotors and facilitators, four sector agronomists, two district agronomists and two district directors. Participants acknowledged the benefits of SNS, particularly in providing subsidized inputs that have led to increased crop yields, such as improved maize and potato production. They also appreciated the use of smartphones for accessing agricultural information, market prices, and SNS notifications. However, concerns were raised regarding the registration process, especially the requirement for Unique Parcel Identifiers (UPIs), which some feared could lead to land loss or collateralization.

Despite the advantages, several challenges were identified, including complex and lengthy registration processes, difficulties in obtaining UPIs, and mobile connectivity issues that hinder timely input ordering. Participants also reported delays in input distribution, which affected productivity by missing planting windows. Additionally, while the training provided by farmer promoters was deemed beneficial, there was a need for ongoing support to ensure the effective utilisation of SNS (Rabourn et al., 2024). The discussions also highlighted issues related to market access, as increased production did not always translate into financial benefits due to limited access to markets.

Figure 8: Focus Group Discussion on SNS use and challenges by farmers in Huye District.

To address these challenges, participants suggested simplifying the registration process, enhancing connectivity, and offering more localized weather information through multiple channels. They also recommended flexible input ordering options, such as offline sales by agro-dealers, and tailored support for farmers with limited literacy or those using rented land. Other recommendations included building financial trust among farmers, improving transparency in financial obligations, and ensuring timely input deliveries aligned with planting seasons. Continuous stakeholder engagement will be crucial in refining the system to better meet user needs. Detailed implementation plan that supports the scaling strategy is provided in Annex IV.

1.5.4 *Innovation Piloting Training and dissemination*

Two training workshops were conducted over two days each in the Nyanza and Rubavu districts from the 30th of July to the 1st of August and the 2nd and 3rd of August respectively. The training was focused on equipping 50 farmer promoters and farmer facilitators in each district with key information on the SNS-FRT. In total 100 farmer promoters

and facilitators were trained on the tenets of the core innovation as well as its implementation for achieving optimum yield results. These farmer promotors and farmer facilitators were handed printed materials (Annex IV) for reference and use in conducting their training together with standardised forms for registering their participants.

Training Targets: Each of the 100 trained farmer promoters and facilitators was assigned the responsibility of training 100 farmers, with the overall objective of reaching at least 10,000 farmers in both districts. The selection of these farmers was strategically planned to ensure a 60-40% gender ratio favoring women and to include champion youth farmers. This approach aimed to empower underrepresented groups and encourage their active participation in agricultural innovation. In total, 7,500 farmers were reached and trained. The target of 10,000 was not reached as some villages did not have farmers growing either rice or Potato.

Figure 9: ***Top:*** *Group photo from the combined MELIA and scaling team training of farmer promoters and facilitators in Nyanza district;* ***Left:*** *Group photo from the combined MELIA and scaling team training of farmer promoters and facilitators in Rubavu district;* ***Right:*** *Farmer promoter clarifies concepts to co-participants during the training in Nyanza district, Rwanda.*

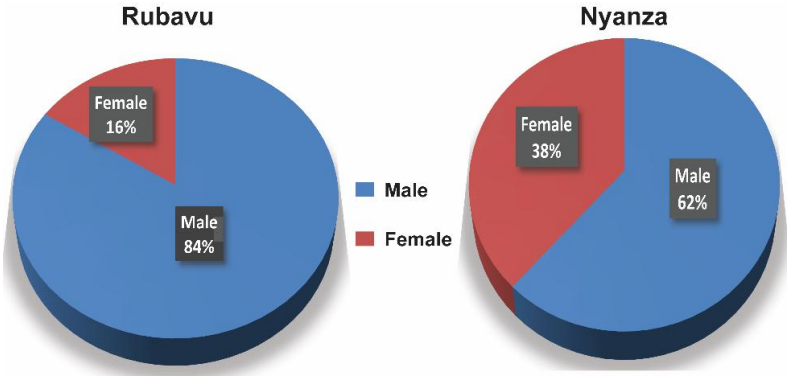


Figure 10:The ratio of male to female trained farmer promoters/ facilitators in Rubavu and Nyanza.

Development and Distribution of Printed Materials: To support the training efforts, 2,000 flyers detailing the core innovation and best agricultural practices for rice and potatoes were developed in the local language (Kinyarwanda) and printed (Annex II). These extension materials were distributed to the 100 trained farmer promoters and facilitators, who will use them during their training sessions to reinforce key concepts and provide farmers with a tangible resource to reference.

Survey on Dissemination Mechanisms: During the workshops, the scaling team conducted a survey to identify the most effective dissemination mechanisms at the village level in Rwanda. The survey revealed that community or village meetings were the most effective, followed by printed materials, radio broadcasts, demonstration sites, and audiovisual presentations (Ogunsanmi et al., 2024). This information was crucial in developing a comprehensive scaling strategy that leverages these channels to maximize the reach and impact of the innovation. The scaling team envisages the development of short videos to be used together with smart projectors, dissemination on WhatsApp and potentially on virtual reality goggles.

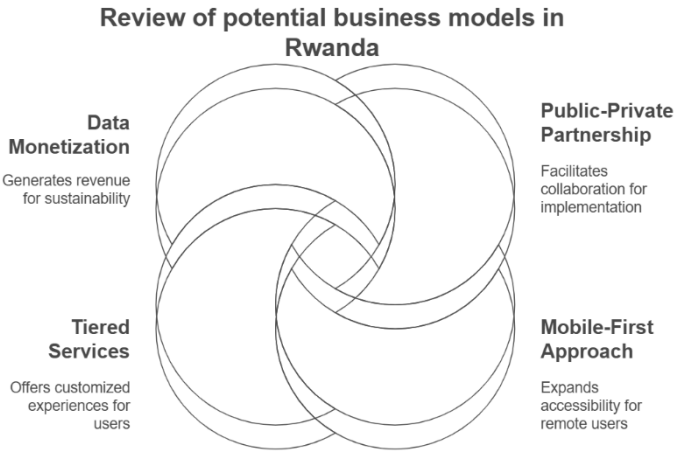
1.5.5 *Collaboration of scaling team with Excellence in Agronomy (EiA) Monitoring, Evaluation, Learning and Impact Analysis (MELIA) team and onset of piloting.*

The Scaling team, in collaboration with the EIA MELIA team, launched a pilot initiative to train 100 farmer promoters and facilitators in Nyanza and Rubavu districts on the SNS-FRT.

Follow-Up and Monitoring: To measure the effectiveness of the training and the adoption of the fertilizer recommendation tool, the program included a follow-up process. A random sample derived from the 7,500 farmers that were reached will be contacted via telephone surveys with questions tailored to our workstreams to assess their knowledge retention and understanding of the innovation. This data will be used to monitor the impact of the program and make any necessary adjustments to the training approach. This shall enhance our adaptation and improvement to the scaling strategy. This pilot initiative is designed not only to train a large number of farmers but also to gather critical data that will further inform the broader scaling strategy. By focusing on effective dissemination methods and conducting thorough follow-up, the program aimed to ensure that the fertilizer recommendation tool is widely adopted and understood, ultimately leading to improved agricultural practices and productivity in the targeted regions (Ogunsanmi et al., 2024).

1.5.6 *Business models*

In the business model workstream, twelve models were assessed and documented. The assessment of the twelve models as potential alternatives to the current government support in Rwanda revealed that the SNS aligns most closely with the Public-Private Partnership (PPP) and Mobile-First approaches. The PPP model has played a critical role in the successful implementation of the SNS, facilitating collaboration between the government and private sector stakeholders. Meanwhile, the Mobile-First approach has enhanced the system's accessibility, significantly expanding its reach to a broader segment of the population, particularly farmers in remote areas (Sartas et al., 2024a).



Despite these successes, there is potential for further development and refinement of the SNS. The evaluation highlights the opportunity to incorporate elements from other models, such as tiered services and data monetization, which could offer more personalized and impactful support to users. Tiered services would allow for customized experiences based on varying user needs, while data monetization could enable the system to generate additional revenue, contributing to its sustainability.

A report detailing this analysis was published on CGSpace (https://hdl.handle.net/10568/162680). This report provides a more in-depth examination of the strengths and weaknesses of the models considered, as well as recommendations for the continued evolution of the SNS in Rwanda's changing policy landscape.

1.5.7 *Fertilizer value chain evaluation*

An in-depth review of Rwanda's fertilizer and input supply chains was conducted using a desktop review of the literature as well as interviews with key stakeholders. The information gathered highlighted critical areas for improvement and proposed solutions to enhance the efficiency of the agricultural input distribution system. Key areas for improvement in the supply chain include policy and governance changes, such as decentralizing decision-making, aligning subsidy policies with broader food systems, and empowering local stakeholders. Operational efficiencies can be achieved through simplifying the subsidy system, ensuring timely input distribution, and improving the overall management system. Financial optimization is critical, with recommendations for redesigning the subsidy system to improve returns, promote competition, and increase access to finance for agro-dealers to ensure input availability throughout planting seasons. A detailed account of the findings were embedded in the scaling strategy as a standalone section.

1.5.8 *Smart Nkunganire System (SNS) Curriculum update*

The workshop for developing the SNS curriculum was held from October 20–23, 2024, at La Palme Hotel in Musanze, Rwanda. Organized by RAB and the International Potato Center (CIP), with technical support from BK TecHouse, the workshop aimed to co-develop a user-centered curriculum for SNS 2.0. The curriculum was designed to enhance the practical skills of diverse user groups including farmers, agro-dealers, agricultural officers, and master trainers across platforms like USSD, MOPA, and web-based systems. The collaborative sessions focused on updating training content, applying user-centered design, and addressing segment-specific needs. Key achievements included drafting practical training modules aligned with the latest SNS 2.0 updates,

integrating visual aids for ease of learning, and planning translations in English and Kinyarwanda (Annex III). The workshop also outlined an action plan for curriculum roll-out, with timelines for training master trainers, district agronomists, and farmer promoters, alongside the development and distribution of extension materials.

Figure 11: Group photo of the curriculum development team comprising members from BKTecHouse, RAB and CIP

1.5.9 *Launch of the recommendation of the fertilizer into the government system*

In December 2024, RAB, in collaboration with CIP, the CGIAR-EiA, BKTecHouse, and the Rwanda Space Agency (RSA), officially launched the Rwanda Soil Information System (RwaSIS) together with the SNS-FRT in Kigali. This event attended by over 100 participants across Rwanda, marked the culmination of four years of intensive soil sampling, analysis, and collaborative research involving key partners such as CIP and the International Institute of Tropical Agriculture (IITA), with funding support from the Bill & Melinda Gates Foundation. In attendance and officiating the even was the Minister of Agriculture and Animal Resources (MINAGRI). The launch event commenced with opening remarks from Dr. Mark Cyubahiro Bagabe, Minister of Agriculture and Animal Resources (MINAGRI), who emphasized the transformative potential of RwaSIS for Rwanda's agricultural sector. He highlighted how precision agriculture through site-specific fertilizer recommendations would optimize fertilizer use, boost crop yields, and mitigate environmental risks. Dr. Job Kihara, co-leader of CGIAR's EiA, also expressed enthusiasm for the strong partnerships established with Rwanda's agricultural authorities. He underscored the significance of science-based agronomic solutions in promoting sustainable farming practices and enhancing productivity.

A highlight of the event was a testimonial from Faustin Munyakayanza, a potato farmer from Nyamagabe District, who shared his success story. He described how transitioning from traditional fertilizer practices to using site-specific recommendations significantly boosted his potato yield from 20 to 30 tons per hectare. The event elaborated on the technical aspects of RwaSIS, demonstrating how the system provides reliable soil data and tailored fertilizer recommendations for priority crops such as potatoes, rice, maize, wheat, beans, and cassava. This technology, integrated with the SNS, aims to increase farm yields by at least 20% while reducing environmental degradation. The launch event successfully highlighted the collaborative efforts behind this innovation, reinforcing Rwanda's commitment to leveraging technology for agricultural resilience, productivity, and sustainability. Further details of the event can be obtained here.

Figure 12: *Group photo taken during the RwaSIS and the new fertilizer recommendation launch at ParkInn by Radison Hotel in Kigali on the 29th of November 2024.*

1.5.10 *Training of master trainers*

In December 2024, RAB, in collaboration with CIP and BK TecHouse, a two-day SNS Master Trainer Workshop was organized at Portofino Villa Hotel, Kigali. The training aimed to enhance the capacity of national master trainers to effectively implement the SNS across Rwanda. The workshop commenced with opening remarks from Dr. Florence Uwamahoro, RAB Deputy Director General (DDG) for Agriculture Development, who emphasized the importance of promoting SNS and supporting stakeholders in understanding the system.

During the workshop, 67 master trainers were trained and commissioned to conduct trainings across the country. They were equipped with hands-on practical training and provided with printed reference materials to support their work. These master trainers are tasked with cascading the knowledge to 416 sector agronomists, who will, in turn, train 14,200 farmer promoters stationed in villages, serving as the last-mile facilitators. The training sessions covered the revised SNS curriculum, practical sessions on navigating the system, strategies for effective district-level training, and long-term user adoption techniques to ensure sustainability and impact at the grassroots level.

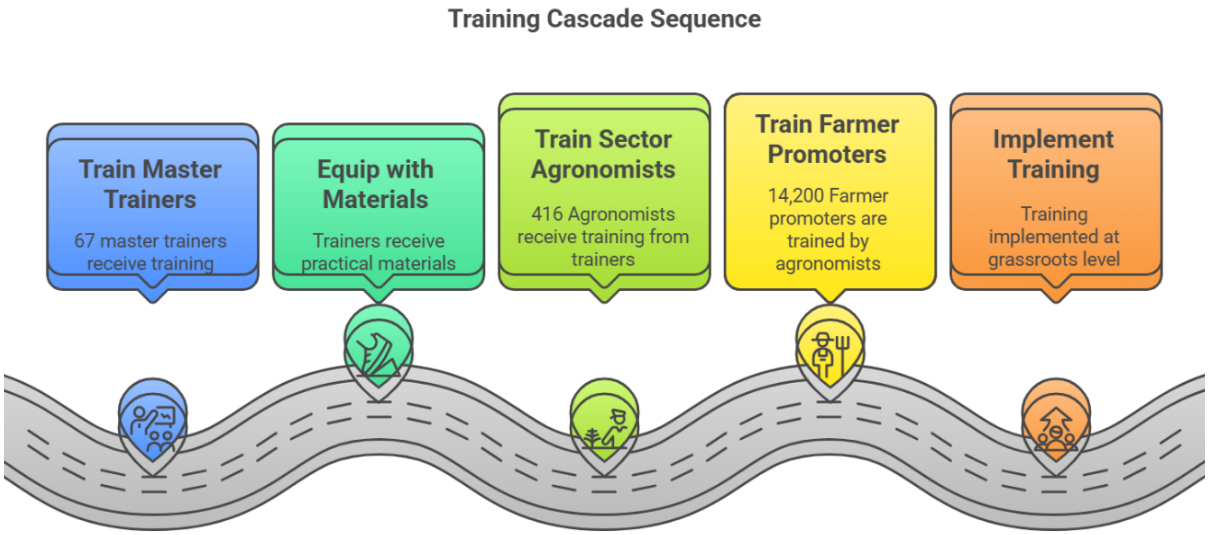


Figure 13: *Sequence of training cascaded to the grassroots level.*

1.5.11 *Write shop*

The write-shop was held on the 18th and 19th of November 2024 at the ILRI Campus in Nairobi, Kenya. This write-shop successfully consolidated key insights and fostered collaboration among the scaling team and the EiA project management team to strengthen the scaling strategy. The main objectives were to (a) collate essential learnings from all workstreams, (b) integrate insights into a comprehensive overview of the scaling strategy, and (c) confirm both the strategic direction and a detailed implementation plan. This plan now serves as a roadmap, guiding activities and milestones for the current scaling period. Additionally, the write-shop produced targeted knowledge products that captured the scaling approach, highlighted best practices, and synthesized critical insights for dissemination to stakeholders, partners, and donors.

The event was structured to maximize collaborative input through interactive sessions designed to refine strategic components, draft the implementation framework, and outline key knowledge products. The write-shop facilitated dynamic discussions, promoted shared understanding, and ensured alignment on objectives. This approach resulted in a robust, actionable plan that supports impactful scaling, enhanced knowledge exchange, and stakeholder engagement across all levels of the project. For more details kindly refer to the blog.

1.6 The Smart Nkunganire System (SNS) Scaling Strategy (2025-2028) Summary Report

1.6.1 *Development of the Scaling Strategy*

The SNS scaling strategy was developed through a collaborative, multi-stakeholder process involving government bodies, private sector partners, research institutions, donors, and farmer representatives. This process emphasized a participatory approach to ensure alignment with Rwanda's national agricultural priorities, sustainability goals, and the diverse needs of smallholder farmers. Key activities included stakeholder consultations, needs assessments, data analysis on SNS's current performance, and benchmarking against global best practices in digital agriculture.

1.6.2 *Key Outputs and Insights:*

- **High-Impact Areas for Scaling:** Expanding SNS Functionality: Introduction of integrated advisory services (fertilizer recommendations, soil conservation techniques, pest management strategies, and water harvesting methods) and micro-finance products to boost agricultural productivity and financial inclusion.
- **Securing Sustainable Resources:** Diversification of funding sources through research grants, venture capital, private sector investments, and international financial institutions. Recruitment of experts in digital agriculture, data analytics, and project management to strengthen operational capacity.
- **Enhancing Stakeholder Capabilities:** Focus on digital literacy for farmers, incentivization programs for extension agents, and development of robust knowledge management systems within stakeholder organizations.

1.6.3 *Scaling Model and Approach:*

- **Public-Private Partnerships (PPP):** Strengthening collaborations for technology enhancement and distribution while ensuring government support in policy and seed funding.
- **Mobile-First Design:** Prioritizing mobile accessibility to improve usability for farmers across varying literacy levels.
- **Tiered Service Model:** Development of customized service packages tailored to different farmer segments based on their needs and technological literacy.
- **Data Monetization and Insights:** Leveraging data analytics to generate insights for stakeholders and exploring data-driven revenue models while ensuring strict data privacy protocols.

1.6.4 *Addressing Critical Bottlenecks:*

- **Fundraising for Sustainability:** Strategic focus on diversifying funding to maintain financial viability beyond donor support.
- **Closing Gender Gaps:** Implementation of gender-responsive programs to ensure equitable access to digital tools, training opportunities, and agricultural resources for women and youth.

1.6.5 *Insights Shaping the Strategy:*

The need for integrated, holistic services beyond agro-input distribution to maximize SNS's impact on productivity and income. The critical role of partnerships in scaling digital platforms sustainably, particularly with private sector and international development actors. The importance of gender inclusion and digital literacy as foundational elements for equitable and widespread adoption of SNS services.

1.6.6 *Next Steps:*

- **Action Plan Development:** Establish detailed, multi-stakeholder action plans with clear timelines, resource allocation, and accountability frameworks.
- **Capacity Building:** Roll out targeted training programs for farmers, extension agents, and partner organizations to strengthen digital literacy and system utilization.
- **Resource Mobilization:** Engage potential funders, venture capitalists, and development partners to secure diversified financial support.
- **Monitoring and Evaluation (M&E)**: Implement a comprehensive results framework with key performance indicators (KPIs), regular reviews, and adaptive learning mechanisms to refine strategies based on real-time data and feedback.
- **Policy Advocacy:** Work with government entities to ensure supportive policy environments for digital agriculture and public-private partnerships.

1.6.7 *Expected Impact:*

The scaling strategy is poised to significantly enhance smallholder farmer incomes, agricultural productivity, and food security in Rwanda. By empowering farmers with vital information, financial services, and improved access to agro-inputs, SNS will contribute to a resilient, technology-driven agricultural sector, setting a benchmark for digital agricultural transformation across Africa.

1.6.8 *Updated state of scaling readiness*

After a year of focused efforts to enhance innovation readiness, Figure 14 presents an updated Scaling Readiness assessment, mapping innovations based on Innovation Readiness (x-axis) and Innovation Use (y-axis). The distribution of innovations highlights varying degrees of maturity and adoption. The Core Innovation, now integrated into the government system and actively piloted among farmers, has significantly advanced in both readiness and use. Its formal acceptance and planned role in guiding the subsidy system suggest that technical barriers have been largely overcome, paving the way for widespread adoption. Feedback from piloting and demonstration sites reveals strong farmer enthusiasm, with many expressing eagerness to adopt the innovation after witnessing its impact (See farmers' comments).

Innovations categorized under "Innovation Improvement" exhibit high readiness and use, demonstrating sustained refinement and scaling momentum. The development of SNS Version 2 and its accompanying curriculum, alongside the training of master trainers, underscores the continuous enhancement of this innovation. Meanwhile, innovations previously in the "Innovation Awareness" category have made a dramatic leap from level 3 to 9, thanks to an extensive national awareness campaign and the strategic distribution of awareness materials. While these awareness-driven innovations have reached national recognition, further development and stakeholder engagement remain essential to solidify their adoption and long-term sustainability.

Additionally, targeted innovations such as Risk Aggregators for Fertilizer Financing and Inclusive Business Models for Innovation continue to show progress but require strategic support for scaling. The presence of Compliance for App Users and User Feedback mechanisms highlights the critical role of iterative improvements in refining innovation readiness and ensuring user acceptance.

To maximize scaling potential, strategies should prioritize the systematic reduction of adoption barriers, proactive stakeholder alignment, and the strengthening of enabling environments. These efforts will accelerate the transition of innovations toward higher readiness and widespread use, ensuring sustainable impact and long-term success.

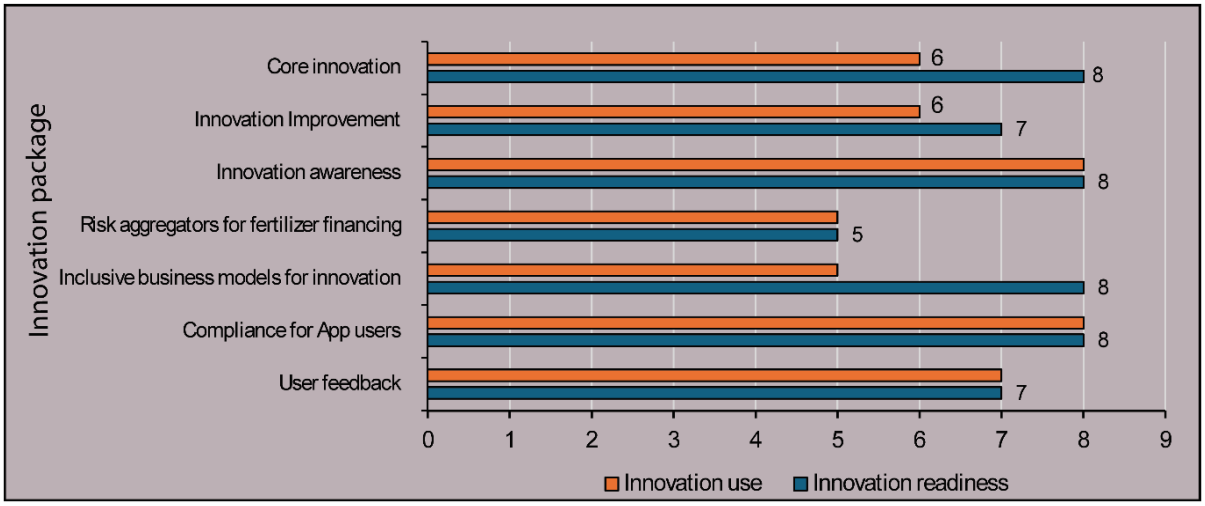


Figure 14: *Status of scaling readiness as at 31st December 2024.*

2. COMMUNICATION AND PARTNERSHIPS

During the reporting period, the scaling team undertook several key communication activities. They held more than six internal meetings, supported by a weekly update every Thursday to ensure and maintain the momentum of ongoing progress. The IPSR report was submitted to PRMS. A detailed reports for each of the workstreams report were published on the CGSpace. Additionally, pull-up banners and notebooks were developed and utilized during workshops and other training and FGD initiatives. Externally, more than five meetings were conducted with RAB, OAF, Rwanda Inspectorate, Competition and Consumer Protection Authority (RICA) to address and resolve bottlenecks and email exchanges with BKTechouse culminated in physical meetings and plan for workshops aimed at providing feedback on the gathered bottlenecks.

In August 2024, we shared a LinkedIn post titled “Rwanda's Digital Revolution in Agriculture: Challenges and Progress in Smart Fertilizer Management” to engage the public and invite their input on potential improvements for the SNS platform. Additionally, several updates were posted on X through the CGIAR EiA and CIP Rwanda handles, showcasing the project's progress from the IPSR workshop through the data-gathering phase and awareness campaigns. Blog posts providing more detailed content, have also been developed and shared with the RAB, EiA and CGIAR communication team for posting.

Another blog post titled "A smart—and smartly delivered—advisory service for Rwanda's small-scale farmers" was developed to summarise the scaling strategy development work and was published the CGIAR News (Mudereri, 2025) (https://www.cgiar.org/news-events/news/a-smart-and-smartly-delivered-advisory-service-for-rwandas-small-scale-farmers/) .

Below are some of the communication links:

1. https://www.topafricanews.com/2024/05/04/the-rwanda-sns-innovation-expansion-tailored-fertilizer-recommendations-for-smart-and-sustainable-farming/
2. https://imvahonshya.co.rw/impuguke-nabafatanyabikorwa-barashakisha-uko-hahangwa-udushya-mu-kunoza-smart-nkunganire-system/
3. https://twitter.com/CipotatoRW/status/1787462787356045762
4. https://twitter.com/CipotatoRW/status/1787462811825676446
5. https://twitter.com/CipotatoRW/status/1787462836928549201
6. https://www.cgiar.org/news-events/news/meet-this-years-winners-of-cgiars-scaling-fund/
7. https://www.linkedin.com/posts/cgiar-excellence-in-agronomy-initiative_agronomy-agronomy4adaptation-usecase-activity-7206264091974262786-gu3E?utm_source=share&utm_medium=member_desktop
8. https://www.cgiar.org/news-events/news/a-smart-and-smartly-delivered-advisory-service-for-rwandas-small-scale-farmers/
9. https://www.cgiar.org/news-events/news/rwandas-digital-revolution-in-agriculture-challenges-and-progress-in-smart-fertilizer-management/
10. https://cipotato.org/blog/rwasis-revolutionary-soil-information-technology/
11. https://rwandainspirer.com/new-fertilizer-recommendations-boost-irish-potato-yields-in-rwanda/
12. https://www.cgiar.org/news-events/news/a-smart-and-smartly-delivered-advisory-service-for-rwandas-small-scale-farmers/

In terms of partnerships, significant progress was made in strengthening relationships with RAB, BKTechouse, and OAF, with ongoing discussions about collaborative efforts in the scaling process. A new partnership was established with farmer organizations such as the Imbaraga farmers organization, which has facilitated a connection to the Cooperatives Association in Rwanda, potentially enhancing collaborative opportunities and expanding the network for scaling initiatives.

3. CHALLENGES AND MITIGATION STRATEGIES

- One of the most significant challenges the team faced was that although significant data and insights were gathered quickly, the project timeline was limited and did not allow for a thorough exploration of the data's potential benefits. There is need for more time in the Scaling fund to further refine the scaling strategy using lessons from the implementation work in the four work packages and lessons learnt through the data collected by the EiA MELIA team. Furthermore, more time was needed to approach donors to support the next steps and build partnerships for sustainability.
- Another significant challenge on our hands was the development of the best business model that guarantees the sustainable adoption of the SNS platform. While we anticipated that the sustainability of the SNS would be robust, 12 potential business models were explored, with three showing promises for the Rwandan context. There is a need to discuss this further with key stakeholders in Rwanda to settle on the best and most feasible model.
- Additionally, across Rwanda, mobile connectivity poses a substantial challenge, making it difficult to propose effective solutions and mitigate the time and effort required to ensure the system functions optimally.
- Delays in funding and HR recruitment impacted the project timeline, coupled with limited local expertise in Rwanda to conduct user experience evaluation. To mitigate these issues, a contingency plan was established to accelerate funding processes and streamline HR recruitment through discussions. Secondly, we collaborated with CGIAR experts in user experience from outside Rwanda, while simultaneously building local capacity by engaging local support staff to be mentored during data collection to develop expertise within Rwanda.
- Partners were anticipating a commitment of funding before they could fully engage during the scaling phase. Therefore, the scaling team needs to collaborate with the identified scaling partners to co-develop proposals that outline the funding commitment and detail the collaborative efforts required for successful scaling.

4. CONCLUSIONS

The SNS-FRT project has demonstrated significant strides in enhancing agricultural productivity, resource use efficiency, and sustainable farming practices in Rwanda. Through strategic partnerships, inclusive stakeholder engagement, and robust capacity-building initiatives, the project has established a solid foundation for the nationwide scaling of site-specific fertilizer recommendations. Key achievements include the development of a comprehensive scaling strategy, the training of master trainers and farmer promoters, and the integration of advanced digital tools within Rwanda's agro-input distribution system.

The project's participatory approach, involving collaborations with CGIAR centers, RAB, BKTechouse, One Acre Fund, and local farmer organizations, has been instrumental in addressing bottlenecks and fostering a shared sense of ownership among stakeholders. The structured workstreams covering user experience, business

models, fertilizer value chain analysis, capacity building, and resource mobilization have provided critical insights, ensuring that the scaling strategy is grounded in practical realities and adaptable to emerging challenges.

Empowerment through training, particularly in scaling readiness and GESI, has strengthened the project's impact, making scaling efforts more inclusive and equitable. The emphasis on interdisciplinary collaboration and proactive communication has amplified the project's visibility, attracting interest and support from diverse stakeholders, including policymakers, researchers, and development partners.

While the project has achieved notable milestones, challenges such as mobile connectivity issues, delays in funding, and the need for sustainable business models were encountered. Addressing these challenges required continued stakeholder engagement, adaptive learning, and strategic resource mobilization. The request for a project extension underscores the commitment to refining the scaling strategy, deepening data analysis, and securing partnerships for long-term sustainability.

Moving forward, the SNS-FRT project is well-positioned to contribute significantly to Rwanda's agricultural transformation agenda. By leveraging the lessons learned, strengthening partnerships, and scaling innovative digital solutions, the project will enhance smallholder farmers' resilience, improve food security, and set a benchmark for digital agricultural innovations across the region.

5. ANNEXURE

Annex I: Scaling team members

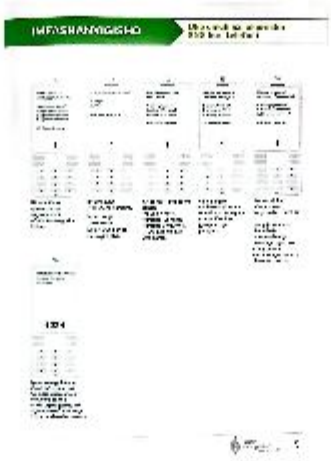
Name	Designation	Institution	Role in scaling team
Bester Tawona Mudereri	Scientist	CIP	Team leader
Tanya Rochelle Rabourn,	Digital Product manager	IITA	User experience analysis
Thompson Ogunsanmi	Scaling Scientist	IITA	Awareness and capacity strengthening
Esther Kihoro	Post Doctoral Fellow	ILRI	
Murat Sartas	Senior Scientist	IITA/ABC	Business models developer and Scaling strategy development Consultant
Edwin Kangethe	Innovation Scaling advisor	CGIAR System Organization	IPSR facilitation and scaling advice consultant
Mousa Senge	Extension expert	RAB/OAF	Fertilizer value chain analysis, Data and intelligence gathering consultant
Maryfaith Simiyu	Digital inclusion	ABC	User experience testing consultant
Seraphine Uzamushaka	Agronomist	CIP	Core innovation

Annex II: Fliers used by training of trainers and dissemination of information on Rice and Potato

Sample potato flier

Sample Rice flier

Annex III: Updated SNS curriculum



Annex IV: Implementation plan

SNS Rwanda fertilizer recommendation tool high-level strategic actions

User experience

Barrier observed in the scoping phase	Strategic action What needs to be done	Expected Outcome	Partnerships needed	Notes e.g potential donors
Emphasize trustworthy guidance Farmers are aware that the SNS system allows them to purchase subsidized fertilizer, however, they may not realize that the amount of fertilizer they are allocated is a well-tailored recommendation intended to optimize their activities and increase productivity. Instead, they might perceive it as a limit imposed because fertilizer is subsidized; believing it is based on economics. As a result, they may not apply the fertilizer properly and may seek out additional fertilizer beyond what is recommended. Ideally, the system will build trust by not only communicating the amount and cost to farmers but also why the amount is advised.	Emphasize recommendations as a primary SNS value proposition while communicating clearly how recommendations are calculated.	1. Farmers are motivated to access the SNS because it provides advice/guidance, not only because it offers subsidies. 2. Farmers believe the fertilizer allocated is intended to increase productivity, not because it's being rationed.	Current communications strategy/marketing company used for promoting SNS, Sector Agronomists, Farmer Promoters	GIZ
Design for independent use. Many farmers depend on intermediaries, such as agro-dealers, to operate their phones, and placing orders for them. This reliance not only limits farmers' understanding of the system but also increases the risk of delays, errors, or even fraud. Encouraging farmers to use the SNS independently would enhance their understanding of the service, reduce the likelihood of miscommunication or manipulation, and ensure timely fertilizer orders. Farmers benefit when using the SNS independently.	Enable farmers to use SNS independently by ensuring they have both the opportunity and capability to do so.	1. More farmers have both the capability and the opportunity to use the SNS digital interface independently successfully to register and order fertilizer. 2. Farmers confirm receipt of fertilizer, and they do not let the agro-dealer or anyone else confirm for them.	Service providers e.g., MTN, airtel, RAB, BKTechhouse	GSMA

Build to scale Most farmers in Rwanda use feature phones, as a result, the SNS service offers a USSD interface allowing most farmers to engage with the service. However, network stability impacts service reliability, and in poor network conditions, it has a big impact on the user experience. In addition, network providers set "timeouts" for USSD services with the expectation that USSD is only used for quick transactions like mobile money payments.	Look beyond USSD and incorporate other technologies while ensuring sufficient network capacity is available.	1. Farmers use multiple technologies as appropriate to register and order fertilizer via the SNS instead of just USSD reducing the questions that must be answered via USSD to a number that aligns with other services commonly accessed via USSD. 2. Farmers do not experience time outs when using the SNS. 3. Farmers do not encounter lack of network. access. 4. Network access and SNS access is easily available because the network and the SNS have increased accessibility and uptime.	Service providers e.g., MTN, airtel, RAB, BKTechhouse	GSMA
Enable location flexibility Agronomists are frequently in the field away from their office and laptop, so they accomplish some of their work on their phone, however, some tasks are difficult to accomplish on small screens so they must wait until they are in the office.	Reduce reliance on paper records and increase trust in the digital experience.	1. Agronomists feel comfortable accomplishing tasks on the SNS that they frequently want to perform when away from their desktop/laptop. 2. Agronomists feel they can easily access the data/reports they want away from their desktop/laptop.	RAB, BKTechhouse	
Build trust in digital systems The platform aims to eliminate fraud, reduce the administrative load associated with processing paper records, and simplify the process of ordering fertilizer. However, this is undermined by the fact that agronomists still download and maintain a lot of documentation. This slows down operational efficiency and undermines the system's goals of streamlining administrative procedures, eliminating approval delays, and transitioning to a paperless, fraud resistant system.	Design for Sector Agronomist context of use.	1. Reports agronomists feel they need are readily available whenever they want them. 2. Sector agronomists do not desire downloading data instead they feel satisfied viewing reports in the SNS 3. Sector agronomists feel confident that any unexpected audit demands can be easily satisfied by accessing reports they feel are readily available via the SNS. 4. Sector agronomists rarely if ever feel the need to print data from the SNS.	RAB, BKTechhouse	UNCDF

Business Models

Barrier observed in the scoping phase	Strategic action What needs to be done	Expected Outcome	Partnerships needed	Notes e.g. potential donors
Lack of feasible fully commercial business models	Enhance and expand collaborations with private sector entities and international organizations to leverage their technological expertise and distribution networks, while the government provides policy direction and seed funding	A larger volume of blended capital on SNS	Investment platforms	Netherlands Govenment, IFAD on blended finance
Insufficient independent use of delivery instruments	Ensure the SNS is accessible and user-friendly on mobile devices to cater to farmers with limited digital literacy	Increased reliance (independent use) of SNS	User Experience teams of BKTechhouse, CGIAR	GIZ
Lack of insufficient customer/ service provider segregation	Tiered Service Model: Develop customized service packages and recommendations based on the diverse needs of farmers with varying farm sizes and technological literacy.	A set of use and service cases including, fully business, hybrid private and public, and fully public	Business development departments of 1AF, BKTecHouse and other small business representatives	CGIAR Scaling 4 Impact Program
Low value generated by the use of the data collected	Data Monetization and Insights Generation: Leverage the system's data collection and analytics capabilities to generate valuable insights for stakeholders, including researchers, policymakers, and private sector entities. Try to build revenue models from data.	Data products, data - service bundles	Business development experts, Analytics experts in BK Tech House, Govt, 1AF	CGIAR Sustainable Farming

Advocacy capacity building

Barrier observed in the scoping phase	Strategic action What needs to be done	Expected Outcome	Partnerships needed	Priority scale (metrics of priority scale	Notes e.g. potential donors
How to extend to more geographies (districts) and crops	Engage through RAB to key into their operational locations	Seamless integration with RAB's operational areas, improving alignment and outreach efficiency.	Partnership with RAB with defined milestones	Number of operational locations engaged and Percentage of RAB's locations covered.	GIZ IFAD CGIAR Scaling 4 Impact Program
Understanding effective dissemination channel	Analyze existing dissemination channels to determine effective ones or a combination of channels	Identification of the most impactful communication channels or combinations to optimize farmer engagement	Collaborative efforts within CIP, IITA, RAB, OAF	Number of channels analyzed. Comparative effectiveness (reach, adoption rates).	GIZ IFAD CGIAR Scaling 4 Impact Program
Agro dealers becoming part of dissemination based on their engagement with farmers	Train a dedicated staff of agro dealer to be responsible for engagement with farmers	Increased capacity of agro-dealers to provide timely and relevant information to farmers.	Agro dealer association (if any) or individual Agro Dealer based on the locations to be involved	Number of staff trained. Post-training competency improvement. Increase in farmer interaction facilitated by agro-dealers.	SFP CGIAR Scaling 4 Impact Program

Transition from donor-led funding to co-financed models involving RAB, private sector partners, and farmer cooperatives.	Link to business models to be operationalized by partners (RAB, OAF, Agrodealers, etc.)	Strengthened value chains with partners actively implementing scaling strategies.	Firm up collaborations with RAB, OAF, Agrodealers	Number of partners adopting business models. Revenue or operational efficiency improvements reported by partners. Farmer inclusion in partner-driven models.	
How to keep monitoring systems to track adoption and impact, enabling real-time adjustments to scaling strategies	Establish monitoring systems to track adoption and impact, enabling real-time adjustments to scaling strategies.	Real-time insights into adoption rates and impact to refine scaling strategies.	Collaboration between RAB, CIP, IITA using exiting MELIA structure	functionality and coverage of monitoring systems. Frequency of data collection and reporting.	
Possible system changes of SNS engagement with extension agents negatively affecting implementation and traction going forward	Conduct an assessment to identify challenges and bottlenecks in the SNS-extension agent engagement process and develop mitigations on expected disruptions	Improved coordination and collaboration between SNS and extension agents and minimized disruptions to ongoing implementation efforts.	Local consultancy in close collaboration with BK Tech House	Mitigation measures developed and number of identified gaps addressed	
Getting buy-in and leverage to cover more districts and crops and reduce cost of extension services/dissemination services	Fully integrate SNS into RAB's operational frameworks, ensuring ownership and long-term sustainability of the scaling effort.	Ownership of scaling efforts by RAB, ensuring long-term sustainability.	RAB and other partners involved in SNS ecosystem	Completion of integration within RAB frameworks. RAB resource allocation to SNS	
How to co-create process with RAB for sustainability	Use participatory workshops with RAB and other value chain actors to design the scaling roadmap, ensuring solutions are tailored to local needs.	Co-created, locally relevant scaling roadmap that aligns with stakeholder needs.		Number of participatory workshops conducted. Stakeholder representation and engagement levels. Quality of the finalized scaling roadmap.	

Fertilizer value chain

Barrier observed in the scoping phase	Strategic action What needs to be done	Expected Outcome	Partnerships needed	Notes e.g. potential donors
Centralized decision-making	Decentralize processes to improve efficiency and adaptability by empowering local stakeholders and streamlining approvals.	Decentralized decision-Making	MINAGRI, RAB	
Limited authority and resources	a multi-stakeholder approach should be implemented, leveraging government endorsement, public-private partnerships, and donor funding	Nationally integrated, sustainable fertilizer recommendation system that ensures widespread adoption, institutional support, and long-term financial sustainability, leading to improved soil fertility and higher crop productivity	MINAGRI, CGIAR, RAB, OAF, Private sector, fertilizer companies, Agrodealers, University of Rwanda, IFDC	BMGF
Subsidy policy misalignment	Facilitate policy harmonization by engaging government agencies, private sector actors, and research institutions to align fertilizer subsidy frameworks with scientifically validated recommendations, ensuring incentives drive optimal fertilizer use rather than blanket distribution.	A coherent, evidence-based subsidy policy that enhances efficient fertilizer use, improves smallholder productivity and ensures the sustainability of subsidy programs through targeted support.	RAB inputs and subsidy unit, MINAGRI,	
Delayed input distribution	Strengthen last-mile input supply chains by integrating digital ordering systems, decentralized storage hubs, and public-private logistics partnerships to ensure timely procurement, stocking, and distribution of fertilizers aligned with the cropping calendar.	Timely and efficient input delivery, reducing planting delays, improving fertilizer accessibility, and enhancing crop productivity for smallholder farmers.	Transport sector,	Mastercard foundation, BMGF
Lack of Awareness and Engagement	Implement a nationwide awareness campaign using radio, SMS, digital platforms, and farmer field schools, combined with extension agent training and demonstration plots to actively engage farmers and stakeholders in the benefits of fertilizer recommendations.	Increased farmer adoption, improved stakeholder buy-in, and enhanced scaling efficiency, leading to better soil fertility management and higher crop yields	RAB, Twigire Muhinzi, RBA, MTN, local government, CGIAR	FAO, Mastercard foundation, BMGF
Market Inefficiencies	Develop transparent, data-driven fertilizer supply chains by promoting market intelligence systems, digital trading platforms, and competitive private-sector participation to improve pricing, availability, and distribution efficiency.	A stable, efficient fertilizer market with fair pricing, reduced supply gaps, and improved farmer access, leading to increased adoption and sustained agricultural productivity.	MINECOFIN, RAB, CGIAR	
Lack of Competition	Promote market liberalization by encouraging private-sector participation, streamlining regulatory frameworks, and providing incentives for new	A competitive fertilizer market with affordable prices, improved supply chain efficiency, and	RICA	

	entrants, while enhancing transparency in procurement and distribution.	increased farmer access, leading to greater adoption and long-term sustainability.		
Inequitable Subsidy Distribution	Strengthen and implement a targeted, data-driven subsidy allocation system using digital farmer registration, e-vouchers, and geospatial analytics to ensure subsidies reach the most vulnerable and high-impact farmers equitably	A fair and efficient subsidy system that enhances access for smallholder farmers, optimizes resource allocation and improves agricultural productivity and food security.	MINAGRI, CGIAR, RAB, OAF, Private sector, fertilizer companies, Agrodealers, IFDC	
Focus on High-Value Crops	Develop a balanced subsidy and investment framework that supports both high-value and staple crops, ensuring inclusive input access, diversified production incentives, and market linkages for smallholder farmers.	Improved food security, economic resilience, and diversified farmer incomes, reducing dependency on a few high-value crops while enhancing overall agricultural sustainability.	MINAGRI, CGIAR, RAB, OAF, Private sector, fertilizer companies, Agrodealers, University of Rwanda, IFDC	

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