CGIAR SCALING FOR IMPACT

IWMI International Water Management Institute

TECHNICAL REPORT

Stakeholder Profiling and Innovation Scaling Demand Signaling in Nigeria

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About CGIAR Scaling for Impact (S4I) Program

Scaling for Impact (S4I) is a CGIAR program (2025–2030) that tests, refines, and scales innovations in food, land, and water systems. It works to align those innovations with stakeholder needs to achieve transformative impact.

Website: https://www.cgiar.org/2igar-research-porfolio-2025-2030/scaling-for-impact/

About CGIAR

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Front cover photo: Participants at the Stakeholder Profiling and Innovation Scaling Demand Signaling workshop in Abuja, Nigeria (*photo:*Adebayo Oke/IWMI)
Back cover photo: Wheat Demonstration field in Alkamawa, Kano, Nigeria, (*photo*: IWMI)

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Summary

This report synthesizes findings of eliciting, documenting, and interpreting demand signals related to innovation scaling across agri-food, water, nutrition, and climate-resilient systems, with a particular focus on how diverse stakeholder groups articulate needs, priorities, constraints, and opportunities for scaling innovations in Nigeria. These findings are based on analyzing qualitative datasets collected from a workshop organized by the International Water Management Institute (IWMI) on *Stakeholder Profiling and Innovation Scaling Demand Signaling* in Abuja, Nigeria, in December 2026, under the CGIAR Scaling for Impact (S4I) Science Program. Drawing on participatory exercises and stakeholder profiling data, the analysis identifies five core stakeholder groups from the public sector, the private sector/investor community, research and academia, farmer-based organizations/Non-Governmental Organizations /Civil Society Organizations, and development partners/donor organizations. It examines how the stakeholders' articulated demands align with, or diverge across, key innovation domains. The findings reveal evidence of market pull and institutional demand for innovations in climate-smart agriculture, digital and data-driven solutions, food distribution and supply chains, as well as local food systems. However, demand articulation remains fragmented, often constrained by weak enabling environments, limited coordination, infrastructure deficits, and capacity gaps.

Drawing on theories and concepts from the innovation scaling and demand signaling literature (e.g., market pull versus technology push, user demand articulation, institutional embedding, and scaling pathways), the report shows that many expressed demands are systemic rather than purely technological. Stakeholders consistently emphasize the need for bundled solutions that integrate technology, finance, policy support, capacity building, and social legitimacy. The report concludes with implications for research and recommendations to strengthen demand-responsive innovation design, scaling strategies, and future data collection.

1. Background

The CGIAR Scaling for Impact (S4I) Science Program is a pioneering program fully dedicated to scaling land, food, and water system innovations. The S4I program addresses critical challenges related to climate change, environmental degradation, geopolitical instability, population growth, rising inequality, and unsustainable diets. Scaling innovation is difficult in achieving widespread, inclusive, and lasting change in farming practices, policies, and technologies. While CGIAR and partners generate a wide portfolio of technological and institutional innovations, scaling often falters due to insufficient understanding of who demands what, why, and under which conditions (Klerkx et al., 2019; Woltering et al., 2019). Demand is not limited to end-user preferences; it also includes institutional, policy, financial, and market signals that shape adoption and diffusion pathways.

Within the S4I Science Program, the Area of Work 1 (AoW1) centers around demand signaling for scaling demand-and-supply matching. Specifically, it aims to understand the priorities, constraints, and expectations of diverse stakeholders to inform Research for Development (R4D) investments in innovations with higher scaling potential and societal relevance. This report presents the results from a qualitative data analysis to inform CGIAR innovation portfolios, scaling pathways, and the design of a demand-signaling dashboard. The data were collected from a workshop on "Stakeholder profiling and innovation scaling demand signaling," held in Abuja, Nigeria, on 4 December 2025, for profiling key stakeholder groups and their roles in scaling, eliciting innovation-related needs, demands, and existing solutions across multiple thematic areas, and identifying barriers, drivers, and strategies for scaling priority innovations. The report continues with the Section "Conceptual Framework" to guide the analysis, followed by the Section "Results," synthesizing the findings, and the conclusion.

1.1 Analytical Framework

Figure 1 presents a conceptual framework that guides the analysis, synthesis, and presentation of the findings on the stakeholder profiling and demand signaling. Concepts of user demand articulation (te Kulve et al., 2018; Boon et al., 2008) are central to this analytical framework, emphasizing the role of stakeholders in defining innovation requirements and scaling pathways (Minh and Schmitter, 2025; Wigboldus et al., 2016). In this context, innovation scaling is viewed as a multi-dimensional process of institutional, social, and technical change (Wigboldus et al., 2016; Sartas et al., 2020; Woltering et al., 2024; Minh and Schmitter, 2025).

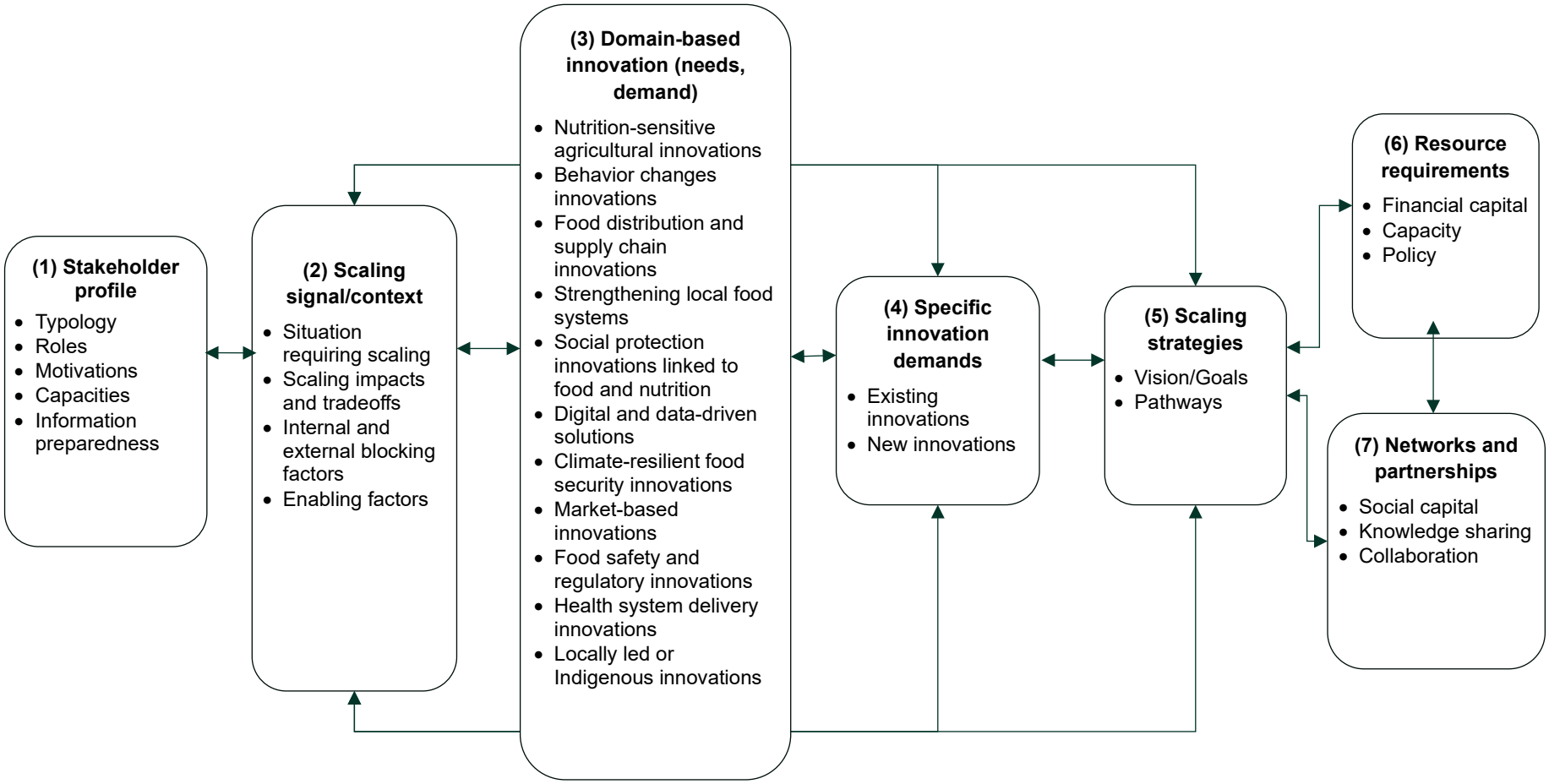

Figure 1. Analytical framework of effective innovation and scaling demand signaling (*Source:* constructed by authors)

Stakeholder profile captures details of stakeholders' characteristics, scaling-related identities, scaling preparedness, and potential impact on scaling. Stakeholders typologies include 1) innovators and scaling actors (private and public sector, and other market actors), 2) investors (accelerators, development partners, donors, investors, and financial institutions), 3) strategic stakeholders (policymakers, government agencies, other public sector actors), 4) facilitators and influencers (research organization, universities, CSOs and NGOs, and other knowledge partners) and 5) end-users (farmers and their communities).

Stakeholders' roles define the functional relationship a stakeholder has in the agri-food value chain (upstream, midstream, or downstream). It describes their level of authority, their specific responsibilities, and where they sit within the ecosystem (e.g., internal versus external). For example, regulators or policymakers set legal standards for food safety and environmental impact.

Stakeholders' motivation is the "why" behind a stakeholder's actions. This involves identifying their underlying interests, goals, and what they stand to gain or lose. Understanding these helps in predicting their level of support or resistance. Example: smallholder farmers may be motivated by yield stability and lowering input costs (e.g., spending less on fertilizer).

Capacities refer to the resources and abilities a stakeholder brings to the table. This includes their financial power, technical expertise, social influence, or the amount of time they can realistically dedicate to the project. For instance, a large industrial farm has the financial capacity to buy an autonomous tractor, while a small-scale farmer might only have the social capacity to access it through a cooperative sharing model.

Information preparedness assesses what stakeholders know and how they prefer to receive information. It measures their current level of awareness, their technical understanding of the subject matter, and their existing biases. For instance, researchers are highly capable of interpreting raw data maps, but local farmers may require simplified SMS alerts that provide direct action steps ("spray tonight") rather than complex charts.

The ***scaling context*** includes various variables. Situations requiring scaling embrace 1) scaling the ready-to-scale innovations (e.g., solar-based irrigation, improved seeds, climate information services), 2) solving large-scale/system problems (e.g., social inequality, public health risks, climate change, plastic pollution, achieving Sustainable Development Goals (SDGs) and influencing policy/institutional changes), 3) seizing opportunities (e.g., for change/transformation, research, innovation, growth, and creating scaling demand), and 4) triggering system changes (e.g., adapting to changing circumstances, fostering adaptive scaling cultures, shifting to an inclusive business environment, shifting to clean food systems).

Scaling impacts and trade-offs involve identifying who gains and who loses as an innovation grows. Trade-offs often occur between economic efficiency and social equity, or environmental health. For example, scaling mechanized harvesting in rice farming increases efficiency and lowers consumer prices (positive impact). However, it may displace seasonal manual laborers who rely on that income (negative trade-off), requiring them to find new roles in the value chain.

Resources needed for scaling include the specific assets stakeholders must contribute or possess to take an innovation to the next level. This goes beyond just capital to include knowledge and networks; credit facilities for farmers to purchase solar-powered irrigation; training extension agents to troubleshoot new digital platforms; or warehouse space or cold-storage logistics to handle increased yields.

Internal and external blocking factors are the barriers that prevent stakeholders from adopting or supporting an innovation. These are categorized by whether they originate from within the stakeholders' control or from the broader environment. For instance, in regenerative agriculture, an internal blocker might be the farmer's habit of deep tilling. In contrast, an external blocker is a government subsidy program that only rewards high yield monocropping.

Enabling factors are the conditions, policies, or attitudes that make scaling easier and more likely to succeed. It includes policy support, market demand, and social capital. For example, the scaling of hydroponic farming in urban areas can be enabled by zoning laws that allow for commercial food production in city centers and the growing trend of local food sourcing in restaurants.

Domain-based innovation demands can be identified by reflecting on 1) needs (or problems people have that can be solved with innovations, 2) demand (or what innovations people want), and 3) existing innovations that should be scaled. Eleven categories are selected to identify innovation demand, as presented in Figure 1.

Specific innovation demands refer to the precise technical, functional, or social requirements that a specific domain, such as food distribution and supply chain, needs to solve a pressing problem. It identifies the gap that the innovation must fill to be useful. For example, in precision agriculture, the demand could be for data and real-time soil moisture sensors that can trigger automated irrigation valves to prevent crop stress during dry spells without wasting water.

Scaling strategy and pathways describe the vision, goals, and pathways for how an innovation moves from a localized pilot to a system-wide standard. Pathways can be commercial (private sector growth), institutional (government adoption), or community-led (grassroots movements). It entails developing, testing, and refining innovation; localizing and contextualizing innovation; creating enabling conditions and brokering and integrating networks and processes. For instance, a bio-pesticide startup may choose a commercial pathway by partnering with established agro-chemical distributors, or an institutional pathway by getting their product included in government-subsidized initiatives for smallholders.

Resource requirements outline the essential inputs needed to sustain the innovation demand. It includes financial capital, data access, specialized labor, and energy. For example, scaling crop insurance requires funding, quality data, and actuarial expertise to accurately calculate risk, as well as digital literacy training for the insurance agents selling the policies.

Networks and partnerships involve the ecosystem of actors, such as researchers, NGOs, farmers, and retailers, whose collaboration is necessary to validate, distribute, and support the innovation. For example, in circular food waste systems (e.g., turning restaurant scraps into animal feed), a network needs to be built between municipal waste collectors, food safety regulators, processing facilities, and livestock farmers to create an effective value chain.

2. Methodology

2.1 Data Collection

A qualitative dataset was collected from a one-day, in-person stakeholder engagement workshop, involving about 30 participants (23 men and 7 women) (Annex 1) representing five stakeholder groups:

- Public sector (policy makers, government agencies)
- Private sector and investors
- Research and academia
- FBOs, NGO0s, and CSOs

- Development partners and donors

Participatory methods were used, including plenary presentations, buzz group discussions, card-based brainstorming with rotation, and gallery walks. These methods are consistent with innovation systems approaches that emphasize co-production of knowledge and stakeholder engagement in demand articulation (Goñi Mazzitelli, 2025; Hekkert et al., 2007). Four primary data sources underpin this synthesis:

1. **Google Form Survey:** An online survey in Open Data Kit (ODK) was conducted to capture stakeholders' profiling information related to identity, motivation, influence, networks, capacity, and scaling preparedness.
2. **Innovation Demand Exercise**: Stakeholder-homogeneous groups identified *needs, challenges*, *demands/wants*, and *existing or potential scaling innovations* across 11 predefined innovation domains or categories (e.g., climate-resilient food security, digital solutions, food distribution and supply chains).
3. **Innovation Scaling Exercise**: Mixed stakeholder groups selected specific innovations and identified *barriers*, *drivers/opportunities*, and *scaling strategies*.
4. **Innovation Demand Survey:** An online survey in ODK was completed by each participant as the last session of the workshop to capture individual innovation demand.

photo: Adebayo Oke/IWMI

2.2 Data Analysis Approach

The analysis followed a qualitative and quantitative synthesis approach (Heyvaert et al., 2013; Sandelowski et al., 2011), combining descriptive coding of workshop inputs with interpretive and theory-informed analysis. Demand signals was categorized by stakeholder groups and innovation domains, then interpreted using concepts from innovation scaling and demand signaling literature, such as user demand articulation and heterogeneity, market pull versus technology push dynamics, institutional and policy demand, scaling pathways, and enabling environments

2.3 Analytical Approach

The analysis followed a qualitative and quantitative synthesis approach, combining descriptive coding of workshop inputs with interpretive and theory-informed analysis. Demand signals were categorized by stakeholder groups and innovation domains, then interpreted using concepts from innovation scaling and demand signaling literature, such as user demand articulation and heterogeneity, market pull versus technology push dynamics, institutional and policy demand, scaling pathways, and enabling environments

3. Results

3.1 Stakeholder Profiling in Innovation Scaling

Most of the respondents to the stakeholder profiling survey were research organizations, NGOs, and knowledge partners (Figure 2), who can be classified as facilitators and influencers, followed by public sector/government (strategic stakeholders), and the private sector and development partners (innovators and scaling actors).

Figure 2. Stakeholder groups and corresponding respondents (*Source:* constructed by authors)

The stakeholder profiling exercise reveals differentiated roles, motivations, and capacities across groups. **Innovators and scaling actors** were found to be agenda setters and gatekeepers within the innovation system, leveraging strong institutional influence to shape what solutions are prioritized and supported. Their motivations are anchored in system-wide transformation, emphasizing the provision of public goods and enabling infrastructure rather than immediate commercial returns. Accordingly, their demand signals focus on policy coherence, regulatory frameworks, subsidies, and shared infrastructure, such as storage facilities, irrigation systems, and climate information services that lower systemic barriers to scaling. Their capacity lies in convening actors, shaping rules of engagement, and embedding innovations within formal institutional structures, reflecting a predominantly institutional demand logic rather than direct market demand.

Investors were seen to mainly operate as market validators and accelerators of scale, translating innovation potential into financially viable growth trajectories. Their motivations are driven by returns on investment, risk mitigation, and portfolio scalability, which shape how they articulate demand. Investor demand signals strongly align with market pull dynamics, emphasizing solutions that demonstrate profitability, operational efficiency, and scalability. Key areas of interest include logistics optimization, digital platforms, access to finance mechanisms, reliable data systems, and enforceable policy environments that reduce uncertainty. Their capacity lies in mobilizing capital, enforcing performance discipline, and signaling which innovations are ready for investments.

Facilitators and influencers play a dual role as knowledge brokers and innovation generators, often operating at the interface between research, policy, and practice. Their motivations are problem-driven, centered on addressing systemic gaps such as limited climate-smart crop varieties, weak data ecosystems, and insufficient food safety knowledge. They articulate demand for enabling conditions that support research uptake and translation into practice, while seeking clearer downstream signals from markets and policymakers. Within this group, FBOs, NGOs, and CSOs express more context-specific and user-facing demands, focusing on access, affordability, capacity building, and social inclusion. Their capacity lies in local embeddedness, trust-building, and amplifying end-user and intermediary demand within the broader scaling ecosystem.

Strategic stakeholders, such as development partners, multilateral agencies, and high-level policymakers, primarily act as system enablers and strategic aligners. Their motivations are guided by long-term, high-impact outcomes linked to global and regional priorities, including climate resilience, food security, and sustainable development. Rather than articulating explicit product-level demand, they signal implicit demand for scalable, replicable, and digitally enabled solutions that demonstrate measurable impact at scale. Their capacity lies in agenda setting, resource mobilization, and aligning innovation pathways with international frameworks and funding priorities.

The distribution suggests that demand signaling among participants is heavily mediated by facilitators and influencers (64%) (Figure 3), particularly research and non-governmental intermediaries. This is indicative of a knowledge-brokered demand signal where experts articulate needs on behalf of end-users.

The types of actions stakeholders (participants) are currently taking or intend to take to support scaling include formulating clear strategies, assessing scalability, and fostering partnerships. This may represent an explicit demand signal for methodological support and frameworks. It is indicative of a move from ad-hoc piloting to structured scaling by participants, and therefore a need for innovation scaling and scaling pathway tools, as well as multi-stakeholder dialogue platforms, to move beyond planning into active implementation.

Stakeholders' self-assessed information preparedness, to the question of how well participants' current information sources meet their needs for deciding on how to act on an identified demand, 64% indicated *somewhat well*, but highlighted important gaps (Figure 3).

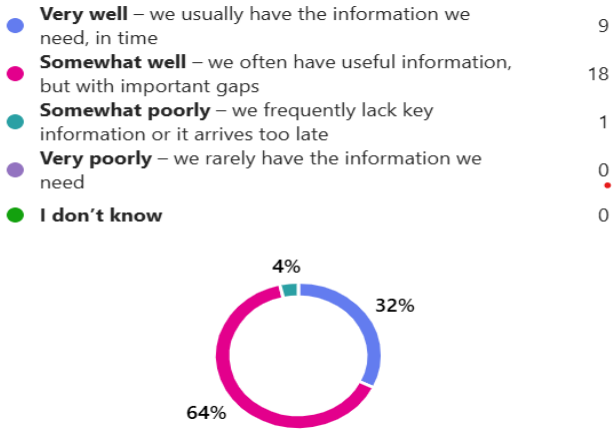

Figure 3. Stakeholders' perception of information readiness (Source: constructed by authors)

This represents a latent demand for better data and evidence. It means that while information exists, it is often not fit-for-purpose for scaling decisions. It is therefore important for CGIAR to prioritize the generation of decision-ready evidence, rather than only technical innovation descriptions.

3.2 Scaling Signal and Context

Situations requiring scaling. Most stakeholders indicated the need for scaling support to *scale specific, ready-to-scale innovations* and *address large-scale systemic problems* (Figure 4). This reveals a dual demand signal: a technology push (finding ways to expand existing technology) and a problem pull (demand-driven by the urgency of systemic crises). There is, therefore, a need to distinguish between scaling out (replicating technologies) and scaling up (changing the institutional systems that govern those technologies), in rolling out innovation scaling in Nigeria.

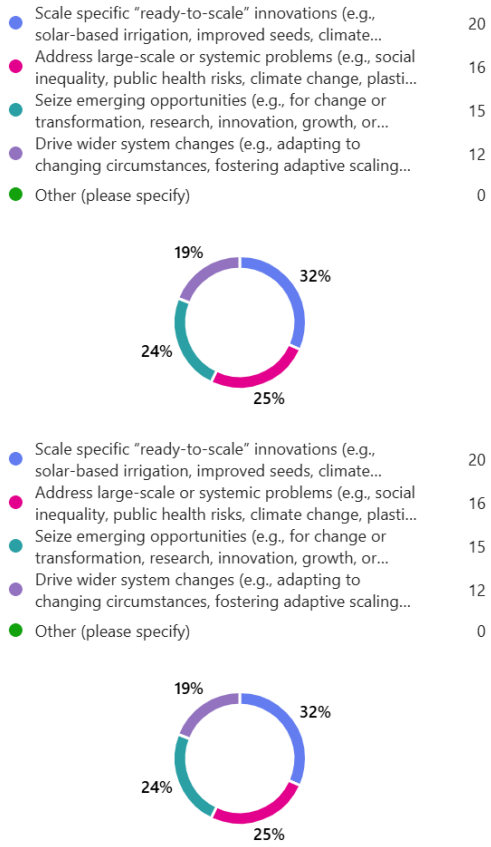

Figure 4. Situations in which participants most need to scale innovations (*Source*: constructed by authors)

Expected impacts and tradeoffs from scaling. The most desired impacts are climate adaptation/mitigation, nutrition/food security, and poverty reduction/livelihoods (Figure 5). Indicating that, scaling is sought to achieve specific resilience and equity goals. Therefore, proven innovations for scaling must align with the appropriate demand signals. For example, explicitly demonstrating how they contribute to climate and food security metrics.

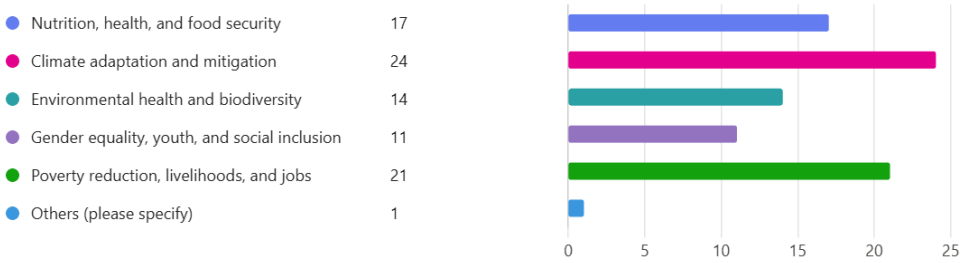

Figure 5. Types of impacts participants mainly aim (*Source*: constructed by authors)

The analysis shows that widening socio-economic inequality, increased inequality, job displacement, and social divide could occur as unintended negative effects when scaling innovations. To manage the situation, *stakeholders* and *collaboration* (Figure 6) were key adjustments that stakeholders are willing to make to their plans or strategies to better manage the unintended negative effects of scaling.

Figure 6. Word count indicating participants' adjustments (*Source*: constructed by authors)

For plans or pathways that are most important for scaling identified innovations to achieve the impacts selected, most participants (23) selected localize and contextualize innovations for broad adoption, aligning business models and investments (Figure 7).

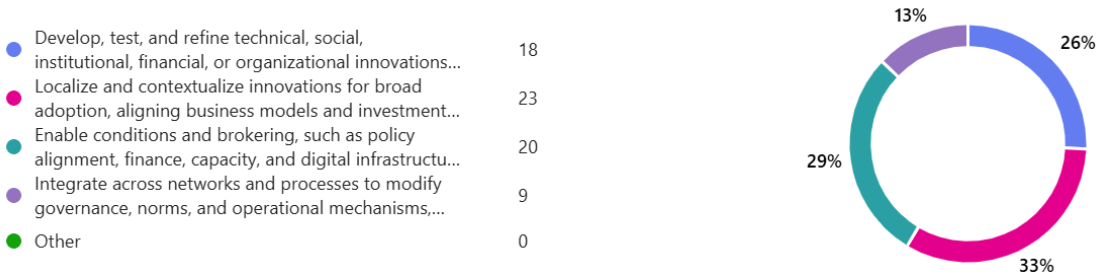

Figure 7. Plans or pathways for achieving scaling impacts (*Source:* constructed by authors)

Internal and external blocking factors. Financial resources, technological access, human capital (staffing/expertise), and partnership arrangements (Figure 8) are the primary internal barriers that most prevent the scaling of innovations. These constraints imply that, even when a strong external demand exists, internal resource gaps may prevent stakeholders from responding effectively.

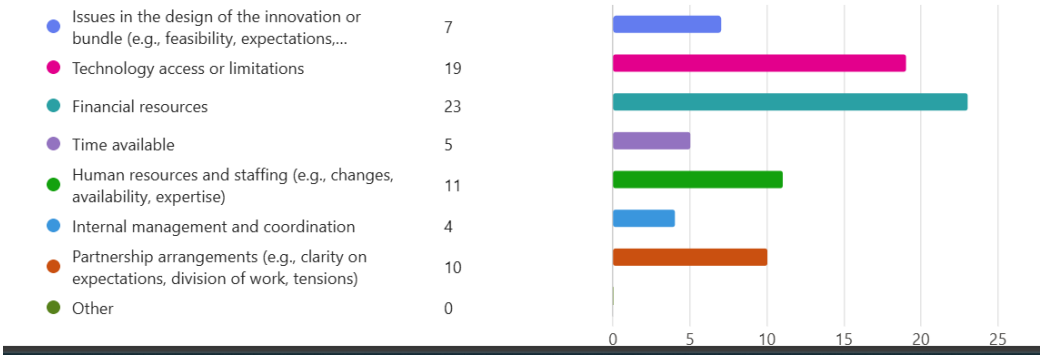

Figure 8. Participants' indication of internal barriers that prevent scaling (Source: constructed by authors)

Market conditions (profitability/access), political factors, and climate hazards (Figure 9) are the most significant external barriers. These barriers can drown out genuine demand signals from end-users or farmers. Thus, innovation scaling efforts should include de-risking mechanisms (e.g., blended finance or policy incentives) to bridge the gap between demand and market viability.

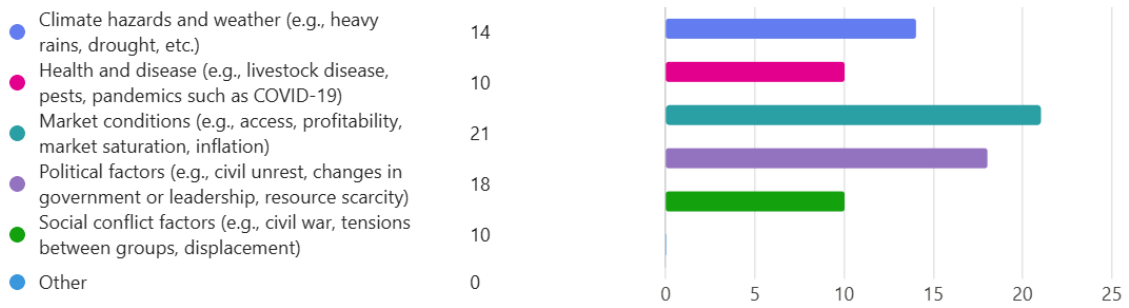

Figure 9. External factors that prevent participants from scaling innovations (Source: constructed by authors)

Enabling conditions for successful scaling. Growing *global food demand* and *climate change adaptation/mitigation* are the strongest drivers that enable innovations to scale (tied at 21 responses) (Figure 10). This suggests that participants perceive scaling to be primarily motivated by urgent, global-scale crises. *Availability of resources/funding and digital innovation* follow closely (17 responses), while a *supportive policy environment* (16 responses) is seen as slightly less critical but still significant. There are impact-driven scaling demands, being signaled largely by necessity. This is because the high scores for food and climate change indicate a massive demand for innovations that solve survival-level challenges.

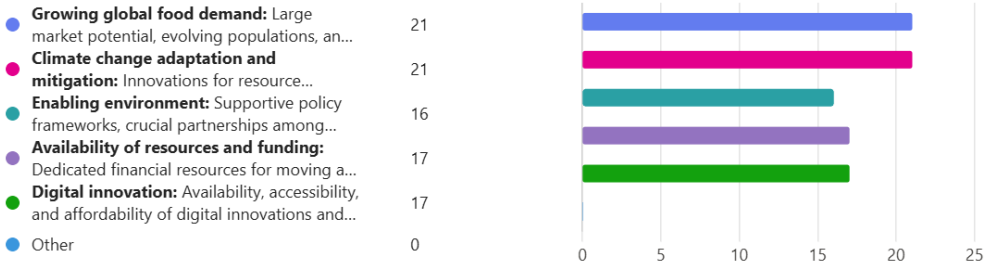

Figure 10. Enabling factors that support innovation scaling (*Source:* constructed by authors)

The enabling conditions necessary to implement scaling pathways are presented in Figure 11, which focuses on the internal and structural requirements to execute scaling plans. The most critical condition is strategic partnerships (22 responses). This indicates that no single entity can scale innovation alone; success depends on relational networks. Financial resources and socio-economic resources are nearly as vital, followed by human capital.

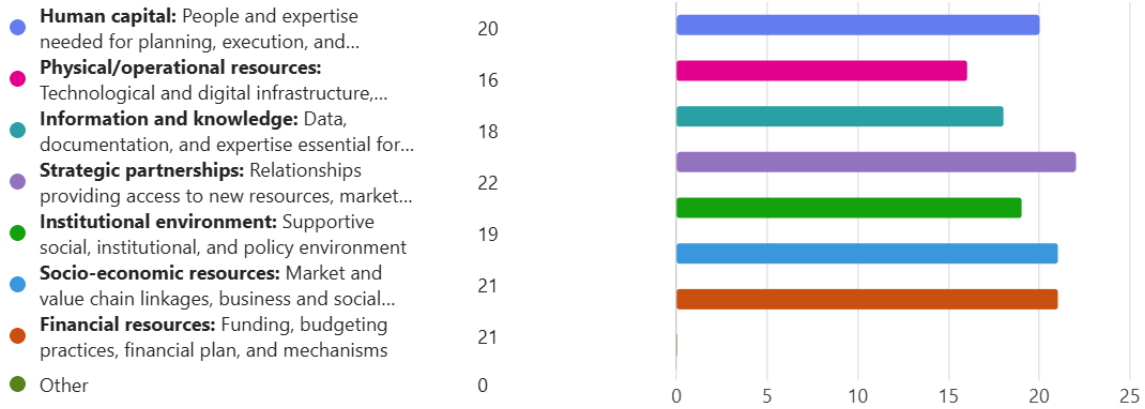

Figure 11. Enabling conditions most important for successfully implementing plans/pathways (*Source:* constructed by authors)

The importance of strategic partnerships signifies collaborative demand for integrated solutions. Stakeholders are not just looking for a product; they seek a collaborative ecosystem that brings together market linkages (socio-economic) and expertise (human capital). The high value placed on funding and financial mechanisms indicates that while the demand for innovation is high, there is a secondary demand for de-risking investments in those innovations through stable financial backing.

3.2.1 Domain-based innovation demand signaling

This section captures stakeholders' needs, demands/wants in relation to the relevant innovation domains.

Climate-resilient food security innovations. Across all stakeholder groups, climate-resilient innovations generated the strongest and most convergent demand signals. Needs include water scarcity, unpredictable weather, land degradation, limited access to finance, and inadequate infrastructure. Particularly, stakeholders expressed a need for localized agro-weather information and drought-resistant crop varieties to combat unpredictable weather. Demand focuses on climate-smart varieties, efficient irrigation systems, early warning systems, capacity building, and affordable precision tools. From a theoretical perspective, this reflects a strong problem-driven market pull, reinforced by institutional urgency linked to food insecurity and climate risk. Scaling barriers (finance, insecurity, technical know-how) indicate that demand exists but is constrained by weak enabling environments, consistent with scaling literature that highlights the importance of complementary assets (Wu et al., 2025).

Digital and data-driven solutions. Digital innovations elicited demand from all stakeholder groups (examples include market intelligence systems, e-wallets, and USSD-enabled extension tools to bridge information gaps), though articulated differently. Researchers and FBOs emphasized advisory services and localized agro-weather information, while private sector actors highlighted data quality, interoperability, and affordability. Public sector demand centered on leveraging weather and agricultural data for planning. This pattern aligns with latent demand in digital agriculture: high perceived value but constrained adoption due to infrastructure, literacy, and cost barriers. The findings support the notion that digital scaling requires ecosystem-level coordination rather than standalone technologies.

Food distribution and supply chain innovations. Demand signals here were particularly strong from private and public sector actors. Needs include storage, logistics, energy costs, and food safety, while demands focus on solar-powered processing, cold chains, market intelligence, and efficient transport systems. For instance, a collective demand exists for solar-powered processing machines to mitigate high fuel costs that increase production expenses; efficient farm-to-market logistics and affordable cold-chain solutions to reduce post-harvest losses. The dominance of supply-chain-related demand suggests a failure of market coordination, where innovations exist but are not sufficiently aligned with infrastructure, trust, and governance mechanisms. This reflects classic innovation system bottlenecks rather than a lack of technology.

Strengthening local food systems. Demand in this domain is primarily institutional and collective. Stakeholders identified informal value chains, weak legal frameworks, cultural barriers, and a lack of hubs as key constraints. Demands emphasize Public-Private Partnerships (PPPs), community-based organizations, legal reforms, and capacity building. This highlights the importance of institutional embedding for scaling, where innovation success depends on governance reforms and social organization rather than technological novelty.

The analyzed information indicates that, generally, research/academia signals often reflect a technology push (e.g., biofortified varieties, precision agronomy). In contrast, the private sector signals a market pull driven by profitability, large vulnerable markets, and the urgency of the

global food crisis. Public sector actors highlight the need for legal frameworks (e.g., empowering water user associations) and land reforms. This suggests that technical innovations cannot be scaled without corresponding institutional innovations.

3.2.2 Specific innovation demand signaling

This reflects existing innovations that stakeholders perceived to be available in the country. They highlighted several innovations already in use or ready for scaling, particularly in the digital and renewable energy sectors. These include solar dryers, dual-fuel processing machines, and solar-powered cold storage. Digital platforms and tools like RiceAdvice-lite, herbicide calculators, e-wallets, and USSD-enabled extension services are already facilitating better farm management. Furthermore, production techniques such as hydroponics, aquaponics, and rainwater harvesting were identified as sustainable ways to expand production. In the area of social and financial safety nets, existing innovations include conditional cash transfers, insurance for farmers, and the development of digital food supply chains to improve transparency.

3.2.3 Scaling strategies

Scaling strategies portray the vision, goals, and pathways for innovation scaling. The overarching vision for scaling agri-food innovations is to transition from fragmented pilot projects to a resilient, inclusive, and data-driven food system. Nigeria's stakeholders indicated the vision, goals, and potential pathways for scaling specific innovations under some selected innovation domains in Nigeria.

Food distribution and supply chain innovations. A vision of an integrated value chain that eliminates waste and ensures food safety through stable infrastructure and digital traceability. This could be delivered through pathways of:

- Phased infrastructure development: Building affordable, renewable energy-powered cold-chain solutions in incremental phases to manage risk.
- Layered distribution systems: Creating decentralized aggregation centers to reduce transport costs and stabilize market prices.
- Capacity and digital integration: Providing affordable mobile hardware and training procurement professionals in safe handling and digital logistics tools.

Digital and data-driven solutions. The vision/goal is for a transparent agricultural ecosystem where real-time data informs every decision from the farm gate to the consumer's plate. This could be delivered through the pathways of:

- Inclusive technical hubs: Establishing innovation hubs that prioritize gender mainstreaming and youth empowerment through technical training.
- Policy and infrastructure strengthening: Advocating for laws that protect data and providing technological subsidies to lower the entry barrier for smallholders.
- Multinational collaboration: Partnering with global tech providers to bring high-tech infrastructure (satellites/AI) to local contexts.

Strengthening local food systems. A vision/goal of self-sustaining local food hubs supported by equitable access to land, water, and standardized market linkages. This could be delivered through the pathways of:

- Social and legal advocacy: Engaging with traditional and religious leaders to secure social license, while simultaneously liaising with Ministries, Departments, and Agencies, and Local Government Authority to review land-use policies.
- Cooperative models: Promoting co-ownership and risk-sharing through cooperative groups to manage irrigation facilities and aggregation centers.

- Standardization and linkages: Developing local food standards to meet export demands and using digital apps/journals to provide real-time market linkage information.

To ensure these successful pathways are implemented, the stakeholders identified three cross-cutting strategic pillars:

1. Sensitization and perception shifts: Moving away from an innovation push toward demand pull by using social media, traditional leaders, and capacity building.
2. Tailored co-design: Shifting from top-down approaches to participatory design, ensuring innovations meet the specific needs of the end-user.
3. Financial innovation: Exploring alternative funding, such as social finance, Public-Private Partnerships, co-ownership, and risk-sharing mechanisms to overcome the capital gap.

These strategies align with contemporary scaling frameworks that advocate iterative, pathway-based scaling rather than linear expansion.

3.3 Most Needed Resources for Scaling

The Google Form survey identified stakeholder collaboration and partnerships as the most significant requirement for scaling (presented in Figure 12), receiving the highest score of 26. Following closely is the need for financial resources and mechanisms, selected by 25 participants. This aligns with previously identified barriers regarding high logistics costs and the necessity for social finance and risk-sharing models to support adoption among smallholders.

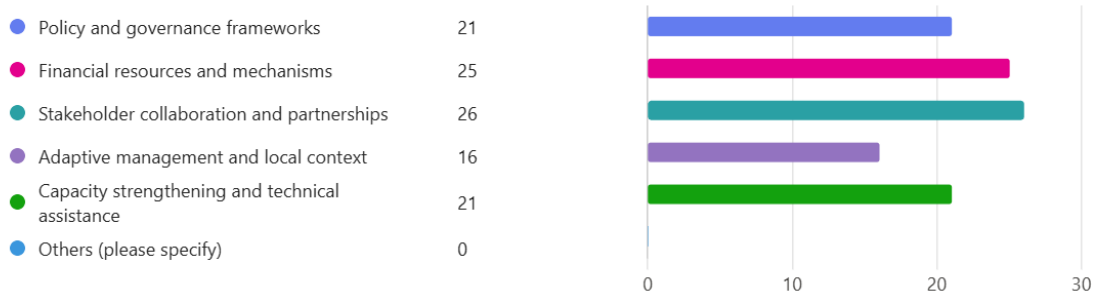

Figure 12. Participants' perception of the most needed resources for scaling (*Source:* constructed by authors)

The analysis further reveals a balanced demand for institutional and technical support, reflecting the need for capacity strengthening and technical assistance, policy, and governance frameworks. With adaptive management and local context scored by fewer (16) participants.

3.4 Networks and Partnerships

Networks and partnerships represent the most critical resource for scaling, as evidenced by the survey results, where stakeholders ranked *collaboration and partnerships* as the highest priority. This component involves a multi-actor ecosystem including researchers, NGOs, farmers, the private sector, and government agencies, whose synergy is required to validate, distribute, and sustain innovations.

A core guiding principle is the shift from top-down approaches to participatory co-design. This ensures that innovations such as solar-powered cold storage or USSD-enabled extension tools are developed in direct partnership with end-users, ensuring they meet the actual demand signals of the market rather than existing as standalone technologies.

3.5 Scaling Strategies and Resources needed

Finally, stakeholders identified for select innovations the key strategies and resources needed to scale innovations. Broadly it is seen that strategies mentioned may be categorised under policy and institutional integration, financial structuring and incentives, capacity and social awareness building, collaborative research and development and networks, operational deployment and delivery models.

3.6 Barriers, Drivers, and Opportunities for Scaling Innovations

Across innovation types, barriers include financial constraints, limited technical capacity, weak infrastructure, poor policy implementation, and insecurity (Figure 13). Three cross-cutting themes recur most frequently: capacity gaps, coordination challenges, and exclusion risks. Many organizations lack sufficient staff, skills, and monitoring and learning systems to manage complex scaling processes.

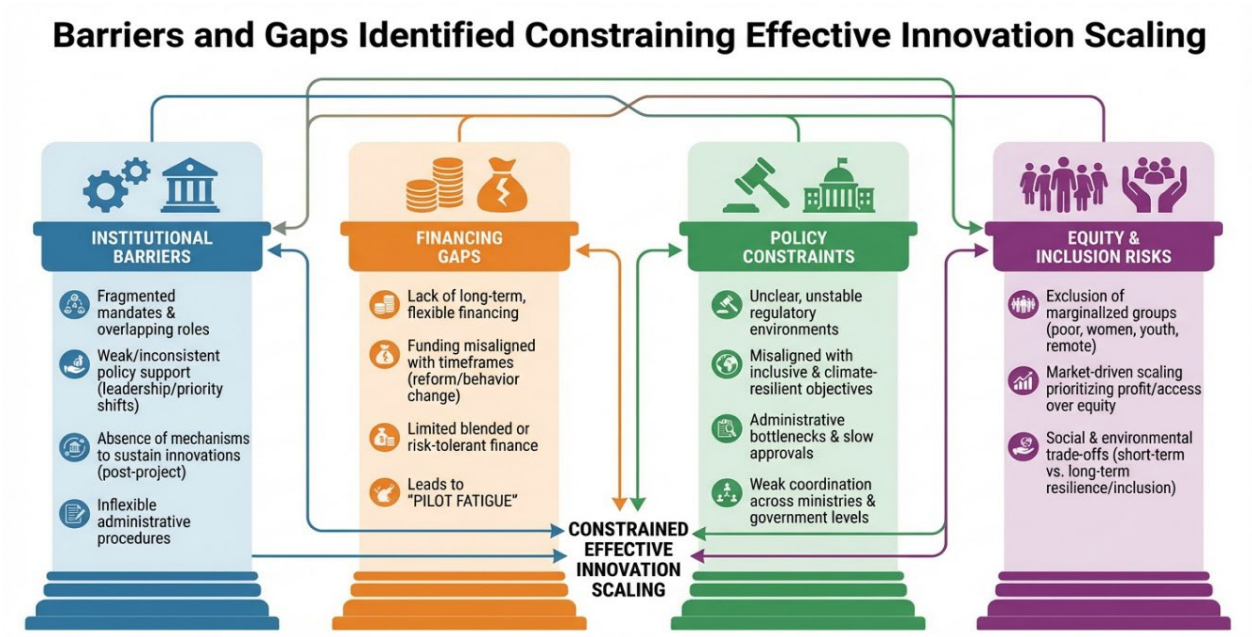

Figure 13. Barrier and gaps identified constraining effective innovation scaling (*Source:* constructed by authors)

Conversely, common drivers include youthful populations, large unmet markets, donor interest, digital penetration, and government commitment (see Table 1).

Table 1. Barriers and opportunities for scaling the selected innovations

Innovation Category	Key Barriers	Key Opportunities
Climate-Smart Agriculture	Financial constraints, insecurity (bandits/kidnappers), and ineffective traditional practices	Youthful population, abundant natural resources, and government commitment
Supply Chain	High logistics costs, supply chain fragmentation, and a lack of trust	Large market size, renewable energy sources, and mobile penetration

Digital/Data	Low digital literacy, high hardware costs, poor data quality	Global donor priority, demand for accurate data, and job creation

The massive growing demand for food and the potential for diverse funding opportunities provide a strong impetus for growth. Leveraging facilitators and influencers, as well as the growing involvement of youth, also serves as a key catalyst. There is a high existing demand for accurate data and digital tools. The proliferation of mobile phone access and broadband internet creates a ready-made highway for scaling digital solutions. Strong government commitment and the presence of localized institutes developing climate-resilient crops provide a solid foundation for scaling.

4. Implications and Recommendations

Insights from stakeholder profiling and demand signaling show several implications for innovation scaling research. **First**, demand is systemic and dynamic. Stakeholder demands rarely target single technologies; instead, they point to bundles of technological, institutional, and financial innovations. **Second**, divergences between research-driven problem framing and market/institutional demand signals risk undermining scaling outcomes. For example, researchers focus on the nutritional efficacy of crops, while the public sector is more concerned with documentation and commercialization limitations of indigenous innovations. Third, institutional demand matters. Public sector and policy-related demand signals are critical determinants of scaling pathways, particularly in climate and food systems. However, it is important to note that limited quantitative prioritization and low/uneven representation across stakeholder groups in the workshop constrain comparative analysis. There was no input provided for "*Behavior change innovations*," suggesting a potential blind spot in current scaling research or a lack of stakeholder familiarity with the concept.

For the successful transformation of the Nigerian agri-food system, shifting toward more integrated, user-centric scaling approaches is necessary. This transition begins with the fundamental integration of demand signaling into the very earliest stages of research prioritization and design, ensuring that innovations are 'market-pulled' by actual stakeholder needs rather than 'technology-pushed' by researchers. Such an approach directly addresses the current gap where research often reflects precision agronomy or biofortified varieties that may not yet align with the practical infrastructure or financial constraints of the end-user.

Furthermore, moving beyond standalone technologies, stakeholders emphasize the development of innovation bundles. These bundles could effectively combine technical tools with the necessary complementary assets, such as supportive policy frameworks, tailored financial mechanisms, and robust capacity-building components. This holistic packaging is essential to overcome the diverse scaling barriers identified, such as the high cost of fuel for processing or the lack of technical know-how in sustaining food nutritional value.

To bridge the gap between innovation and adoption, scaling approaches must be pathway-based and specifically tailored to the unique demand profiles of different stakeholders. This includes strengthening intermediaries such as FBOs and Market System Development (MSD) platforms, which serve as vital translators of demand across different levels of the system. These intermediaries play a crucial role in fostering trust and ensuring that innovations are institutionally embedded within local governance and social organizations.

To overcome literacy and information barriers, the dissemination of data, such as localized agro-weather information, must be prioritized. This information should be delivered through multi-channel platforms, including USSD-enabled tools and digital apps, and must be presented in the preferred local languages of the farmers to ensure it is both accessible and actionable. By

centering the strategy on these interconnected recommendations, the agri-food system can move toward a more resilient, inclusive, and data-driven future.

In all, the Nigeria workshop synthesis directly advances the Demand Intelligence Toolkit by providing empirically grounded inputs that shape the toolkit's data model, use cases, and prototype priorities. Through participatory stakeholder profiling, targeted innovation-demand and scaling exercises, and an innovation-domain taxonomy, the report surfaces the types of signals (needs, expressed and institutional demand, and enabling conditions) that the toolkit must capture, standardize, and display, especially for climate-smart agriculture, digital solutions, supply chains, and local food systems. It identifies who generates reliable signals (public sector, investors, researchers, FBOs/NGOs) and reveals critical metadata requirements—geography, stakeholder capacity, policy stage, and resource constraints—that inform semantic labels, controlled vocabularies, and confidence flags in the prototype. Practical outputs such as prioritized barriers/drivers, resource needs, and scaling pathways offer concrete test-cases for matching innovations to effective demand and for designing dashboard filters, visualization priorities, and user personas. Methodologically, the workshop validates participatory collection methods (surveys, group exercises) as viable ingestion channels and highlights where human-in-the-loop review will be essential to mitigate data gaps and bias. In short, the workshop report supplies both the content and the operational design requirements needed to refine ingestion pipelines, semantic models, and MVP dashboard features—accelerating a demand-driven, user-trusted prototype.

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Appendices

Appendix A. Results of Innovation Demand Exercise.

1. Nutrition-sensitive agricultural innovations

Needs/challenges

- Research/academia
  - Need to increase production of high-yield nutraceuticals in food production such as an increase in flavonoids and capanins with antioxidant properties for health benefits
  - High costs of a healthy diet
  - Malnutrition
  - Food insecurity
- FBO/NGOs/CSOs
  - Monotonous staple bean production
  - Poor farming practices

Demands/wants

- Public sector
  - Demand for lower prices for nutritious food
  - Reduced post-harvest losses to ensure a stable price
  - Wants clean water for irrigation
  - Soil fertility innovations
  - Water-efficient production systems
- Research/academia
  - Personalize the need to consume healthy food all year round for general health and wellness
  - Continuous advocacy for personalized functional food interventions in health care management
- FBO/NGOs/CSOs
  - Sustainable agricultural production

Potential scaling innovations

- Research/academia
  - Improved crop production for nutraceuticals/increase nutrient yields through
    - advocacy for increased crop production
    - Implement water management to improve yield
    - Research on precision agronomy for soil efficacy
  - Encouraging all-season (dry and wet) farming
  - Biofortified crop varieties, yellow maize, Ihakti millet, Samsorg sorghum, and adoption of varieties
- FBO/NGOs/CSOs
  - Hydroponic farming
  - Small-scale farming, home gardening

2. Behavior changes innovations

No input

3. Food distribution and supply chain innovations

Needs/challenges

- Research/academia
  - The high costs of fuel to power existing processing machines which increases costs of production
  - Poor storage facilities
  - Road network and accessibility
  - Market linkages
  - Small-scale processing facilities

    - Post-harvest loss
    - Food safety, quality, and nutrition
    - Food affordability, accessibility due to food loss
- Public sector
    - Harvest and post-harvest losses
    - Poor storage facilities
    - Poor enabling environment by the government
- Private sector/investors
    - Weak, transparent, and storage infrastructure
    - High logistics cost and supply chain fragmentation
    - Market price instability /volatility
    - Food safety and traceability issues
    - Limited/lack of access to digital tools

Demands/wants

- Research/academia
    - Processing machine that is powered by solar energy
    - Bags for grain
    - Advocacy and capacity building/demonstration for existing innovations
    - Market linkages and networking
    - Road network
    - Electricity / solar system
    - Efficient supply chain
    - Affordable storage facilities
    - Enabling infrastructure
- Public sector
    - Sustainable harvest and processing technologies for farmers and marketeers
    - Good storage facilities
    - Good enabling environment by the government
- Private sector/investors
    - Efficient farm-to-market logistics systems
    - Affordability of cold chain solutions
    - Transport procurement systems should have quality and safe handling
    - Data and marketing intelligence

Existing innovations

- Research/academia
    - Existing processing machines can be made dual-fuel and solar-powered
    - Design of provision of dual-powered processing machines
    - Provision of solar-powered processing machines
        - Aggregators
        - Private sector
        - government
    - Solar-powered storage
    - Solar dryers
    - Storage bags
    - Digital food supply chain/market
- Public sector
    - Affordable technologies for harvest, post-harvest, and storage
    - Good governance
- Private sector/investors
    - Promote utilization of solar energy for irrigation systems and other farm uses
    - Massive growing demand for food
    - Massive donor funding potential from the international community
    - Urgency created by the global food crisis
    - Strong and agile youth advantage

4. Strengthening local food systems

Needs/challenges

- Research/academia
  - Lack of rice processing facility
  - Value chain operating informally and not distinctly established as hubs
  - Market linkages are limited due to their informal status
- Public sector
  - Inadequate funding/investments
  - Attitudinal constraint
  - Non-inclusivity/synergy among stakeholders
  - Ownership constraint
  - Lack of knowledge and capacity
  - Cultural/social barrier
  - Non-availability of a legal framework to empower users of local food enhancement systems, such as water user associations (WUA)

Demands/wants

- Research/academia
  - Solar powered processing facility
  - Establish hubs along the value chain to ensure sustainable supply flow
  - Establish and publish market links to enhance market information
- Public sector
  - Provision and sourcing of ?? complimentary funding/investment
  - Encourage PPP
  - Establish community-based involvement, such as water user associations
  - Build the capacity of all stakeholders

Existing innovations

- Research/academia
  - Website pages or apps can be built to address or publish supply flow along the value chains and hubs for adequate market information
- Public sector
  - Establish and strengthen water user associations in public irrigation schemes
  - Huge human resources availability
  - Advocacy/sensitization on gender/inclusion
  - Participatory irrigation systems (FLID)
  - Gender inclusion

5. Social protection innovations linked to food and nutrition

Needs/challenges

- Research/academia
  - Food scarcity in conflict-prone areas
  - Food scarcity in conflict-affected areas
- Private sector/investors
  - Instability of food prices
  - Fragmented value chains between farmers, processors, retailers, and consumers
  - Lack of nutrition awareness
  - Funding barriers

Demands/wants

- Research/academia
  - Relief assistance in the form of cash.
  - Materials, incentives, and subsidized food items
- Private sector/investors
  - Promote the use of digital platforms, making it accessible at subsidized rates
  - Create market/price intelligence systems
  - Access to affordable, nutritious food

    - Creating platforms for monitoring and evaluation
    - Insurance and safety nets for farmers

Existing innovations

- Research/academia
    - Increase in conditional cash transfer to target beneficiaries
    - Improving materials incentives considering economic realities
    - Provision of effective food banks
- Private sector/investors
    - Scaling motivation
        - Large vulnerable market
        - Public/international interest
        - Lower cost of delivery through technology
        - Alignment with government priorities

6. Digital and data-driven solutions

Needs/challenges

- Research/academia
    - Disasters and risks that affect ag-productivity
    - Lack of access to inputs and services such as ag extension
    - Need for precision agriculture tools, building advisory and information services
    - Lack of access to soil health management information and services
- FBO/NGOs/CSOs
    - Access to timely, valuable, localized agro-weather information
- Private sector/investors
    - Poor data availability and quality
    - Low digital literacy among farmers
    - Limited connectivity and fragmented digital solutions
    - High cost of digital hardware

Demands/wants

- Research/academia
    - Precision ag-decision tools
    - Advisory tools
    - Market access tools
    - Soil health management information and services mobile app
- FBO/NGOs/CSOs
    - User-friendly information services that can disseminate location-specific agro-weather information services
- Public sector
    - Leveraging weather information
- Private sector/investors
    - Data-driven advisory and decision tools for farmers cooperatives and the government
    - Affordable tools for data collection as well as accessibility
    - Market and price intelligence systems

Existing innovations

- Research/academia
    - Rice advice-lite
    - Herbicide calculator
    - Natural ag-extension hotline
    - USSD-enabled extension tools
    - SMS alert
    - E-wallet
    - Field area measurements
- FBO/NGOs/CSOs
    - Agro-weather dissemination system that sends weather information/forecast and advisories in farmers' preferred language via multi-channel platforms (sms, uss, wr)
- Private sector/investors

- Scaling motivation:
  - Massive undersized agricultural sector
  - Digital adoption is a priority for donors globally
  - Penetration of mobile devices and the internet is increasing at an increasing rate

7. Climate-resilient food security innovations

Needs/challenges

- Public sector
  - Inputs
  - Inadequate technologies
  - Infrastructure
  - Storage facilities
  - Finance (access to credit)
  - Food insecurity
  - Capacity building
  - Unpredictable weather pattern
  - Enforcement of floodplain reservation
  - Capacity building in the use of irrigation facilities
  - Limited access to climate-related information, data, and early warning systems
  - Inadequate infrastructure/funding resources
  - Land degradation and other environmental constraints
  - Poor water management and water scarcity
  - Conflicts and insecurity
  - Limited knowledge and capacity of climate resilient systems, technology, and practises
  - Limited access to storage and other value chain improvement facilities
  - Pest and disease infestation
- Private sector/investors
  - Funding and investment barriers
  - Lack of access to sufficient data
  - Poor policy enforcement
  - Distrust of new technologies, hence low adoption
  - Talent and technical skill gap
- Research/academia
  - Lack of climate-smart varieties and crops
  - Accessibility to improved crop varieties
  - Drought prevalence
  - Drought
  - Water availability for agricultural production
  - Water storage for agriculture
- FBO/NGOs/CSOs
  - Water scarcity/drought
  - Land scarcity
  - Climate-induced insecurity
  - Soil degradation
  - Financial vulnerability

Demands/wants

- Public sector
  - Funding/subsidy
  - Training/capacity building
  - Adequate infrastructure
  - Agrochemicals, fertilizers
  - Improved budgetary provision
  - Training and retraining
  - Reliable climate forecast/early warning
  - Robust and proactive data/information acquisition equipment, tools, and systems
  - Provision of more infrastructure and technology for climate-resilient systems

    - Provision/sourcing of supplementary financial/credit facilities, such as donors and private sector investment
    - Restoration and reclamation of degraded areas with natural-based measures
    - Deployment of systems/practises that utilize minimum water at an efficient scale as a drop irrigation system
    - Provision of mobile water treatment plants
    - Build capacity and exchange knowledge
    - Provision of adequate storage silos and value chain processing facilities
    - Provide pest and disease prevention/control measures
- Private sector/investors
    - Affordable precision farming tools
    - Improved market access and logistics
    - Tools that reduce post-harvest losses
    - Access to finance
    - Skill upgrade opportunities
    - Create better tools for data management
    - Better policy enforcement
- Research/academia
    - Needs for a cultural shift from traditional varieties to improved
    - Sensitization on climate-smart technologies
    - Developing climate-smart varieties
    - Small-scale irrigation implements (system)
    - All-year-round water availability for agriculture
- FBO/NGOs/CSOs
    - Water-efficient agricultural technologies
    - Climate-controlled agricultural system (greenhouse)
    - Sustainable agricultural techniques

Existing innovations

- Public sector
    - Expand production
    - Adopt AI technologies
    - indigenous knowledge
    - Land reforms
    - Rainwater harvesting
    - Earth dams or retention ponds
    - Use of the latest farm machinery to improve food production
- Private sector/investors e
    - Large market size
    - Global donor interest
    - Urgent and increased demand
    - Young demography advantage
    - Regional expansion/market opportunity
- Research/academia
    - Strengthen innovation platform
    - Research institutions
    - Local fabricators
    - Water provision for agriculture: shallow wells, water reservoirs (at small scale)
- FBO/NGOs/CSOs
    - Hydroponics, aquaponic systems

8. Market-based innovations

Needs/challenges

- Public sector
    - Infrastructure deficit – electricity
    - Information asymmetry
    - Lack of technology for market access

Demands/wants

- Public sector
  - Adequate infrastructure
  - Knowledge sharing
  - Market access through technology

Existing innovations

- Public sector
  - AI adoption
  - E-commerce
  - Peer-to-peer energy sharing

9. Food safety and regulatory innovations

Needs/challenges

- Public sector
  - Improved water and soil input quantities
  - Access to clean irrigation water
  - Training farmers on safe input and production
  - Inadequate funding
    - Expensive modern technology
    - Low government investment in food safety
    - Limited private sector participation
  - Contamination in production input
    - Polluted irrigation water
    - Soil degradation affecting food quality
- Research/academia
  - Knowledge gaps in terms of food safety and regulatory requirements
  - Availability, accessibility, and affordability of tools and testing facilities

Demands/wants

- Research/academia
  - Affordable, accessible, and available testing facilities
  - Training and capacity building on food safety, quality, and regulatory knowledge requirements

Existing innovations

- Research/academia
  - Potential scaling innovations
  - Portable and mobile moisture meters
  - Localized testing centres
  - Capacity information tools on food safety

10. Health system delivery innovations

Needs/challenges

- Research/academia
  - Nutrition-based counselling in communities through trained health care workers
  - Lack of trained health care workers
  - Inadequate government policy and support and advocate for precision nutrition in agronomy

Demands/wants

- Research/academia
  - Poor nutrition
  - Desired for tailored nutrition to meet targeted disease management, like diabetes
  - Establish local health care for urban/rural areas >> trained personnel in precision nutrition

Existing innovations

- Research/academia
  - Tele-nutrition, tele-health
  - Trained community health workers in volved in precision nutritional interventions, partnering, and functional funds

11. Locally led or Indigenous innovations

Needs/challenges

- Public sector
  - Documentation challenge
  - Lack of mechanisation
  - Transfer of knowledge
  - Low yield / limited production
  - Limitation in commercialization

Demands/wants

- Public sector
  - Advocacy drive
  - Documentation
  - Appropriate technology to increase output

Existing innovations

- Public sector
  - Adequate equipment
  - Local knowledge sharing platform
  - Climate-compliant conservation practices
  - Adopt new species/breeds

Appendix B. Results of Innovation Scaling Exercise.

Barriers

- Financial constraints
- Lack of technical know-how
- Conflict and insecurity
- Traditional practices affecting adoption

Opportunities/drivers

- Youthful population
- Abundance of natural resources – land, sun, water
- Localized institutes (developing and climate-resilient crop varieties)
- Government's commitment to the agro-food system

Strategy (how)

- Sensitization and perception shift
- High technologies
- Programs should be designed and tailored to the needs

Under Food distribution and supply chain innovations

Barriers

- Access to funds / stable finance
- Lack of trust among actors
- Infrastructure gaps
- Poor technical know-how
- Poor awareness about innovations
- Top-to-bottom design approach for innovation design
- Lack of social finance for innovations
- Non-involvement of key stakeholders in the design and dissemination of innovations

Opportunities/drivers

- Influencers as drivers of innovation scaling
- Changing demographics, i.e. agricultural value chain that can aid in scaling

- Leveraging renewable energy sources as drivers
- Leveraging digital infrastructures such as increasing broadband internet, mobile phone access etc.
- Very large market that could ensure profitability in the adoption of innovations

Strategy (how)
- Advocacy and awareness
- Social media and digital solutions for dissemination and scaling
- Traditional, local leaders as an entry point and to ensure social license for innovation
- Capacity building and technical know-how
- Co-ownership and risk sharing among groups for innovation adoption

Under Food distribution and supply chain innovations

Barriers
- Weak transport and storage infrastructure
- High logistics costs and supply chain fragmentation
- Market price instability/volatility
- Food safety and traceability issues
- Limited/lack of access to digital tools

Opportunities/drivers
- Scaling motivation/drivers for scaling
- Massive growing demand for food
- Massive donor funding potential from the international community
- Urgency created by the global food crisis
- Strong and agile food advantages

Strategy (how)
- By building affordable cold-chain solutions in phases
- Train transport/procurement professionals to have quality and safe handling skills
- Making mobile hardware and internet services available to distribution/supply chain professionals at an affordable price
- Create a layered distribution system that reduces transport costs and stabilizes supply

Under Digital and data-driven solutions

Barriers
- Lack of data
- Lack of infrastructure (satellite, etc.)
- Limited capacity (human, etc.)
- Lack of finances
- Insufficient policies and implementation framework

Opportunities/drivers
- Demand for digital solutions
- Demand for accurate data
- Collaboration between multinational and local stakeholders

Strategy (how)
- Strengthened collaboration among relevant stakeholders
- Provision of high-tech infrastructure (e.g., satellites)
- Strengthening of relevant laws and policies

Under Digital and data-driven solutions

Barriers
- Education
- Finance
- Technical know-how
- Adaptability, poor attitude to change

Opportunities/drivers

- Acceptability
- Training/seminars
- Job creation/empowerment
- Access to real-time information

Strategy (how)
- Inclusivity (gender mainstreaming)
- Innovation technical hubs
- Technological subsidies
- Finance
- Participatory irrigation systems

Under Strengthening local food systems

Barriers
- Funding
- Differential access to facilities (time and crop specific)
- Restricted access to information
- Insecurity: bandits, kidnappers, cultists, etc.

Opportunities/drivers
- Population of users: youth, smallholder farmers
- Policy
- Facilities (ease of access to the irrigation facilities)

Strategy (how)
- Cooperative or group operation
- Awareness/enlightenment
- PPP

Under Strengthening local food systems

Barriers
- Poor access to farmland
- Cultural/social barriers
- Lack of an adequate legal framework
- Lack of adequate storage facilities/systems
- Unethical preservation practices
- Inadequate funding
- Informal value-chain (hub) for enhanced local food system
- Poor produce aggregation process
- Inadequate technical know-how in sustaining food nutritional value
- Poor food standardization to meet domestic and export demand
- Poor market linkages information

Opportunities/drivers
- Review the land use act to enable farmers more access to farm land
- Strengthen advocacy to the community of religious leaders
- Enact laws that promote participatory farming and empower users of local farm systems
- Provide appropriate storage facilities for various crops at an affordable cost
- Training and enlightenment on appropriate preservation practices/systems
- Explore alternative/complimentary funding opportunities
- Establishment of hubs for the local food system
- Promote the establishment of farm service centers for aggregation
- Training/sensitization on sustaining food nutritional value
- Develop standards to meet both domestic and foreign demands
- Enhance improved market linkage information

Strategy (how)
- Liaise with appropriate MDAs at LGA, state, and federal levels towards improvement of the Land Use Act

- Engagement with relevant stakeholders
- Develop policies/laws that promote local food systems and empower their users towards their sustainability
- Provide information on the availability of appropriate safe storage systems
- Seminars, workshops, and jingles
- Source for donors, investors, and development partners
- Establishment/strengthening of cooperative groups
- Setting up local aggregation centers
- Provision of training, seminars, workshops, and jingles on sustaining food nutritional values
- Align with established domestic/international standards
- Publish website page, apps, and journals on market linkage information

Appendix C. Link to Results of Stakeholder Profiling Survey.

Survey on Scaling Demand Signaling – Collaboration

Appendix D. List of Participating Organisations.

1. AfricaRice
2. Abiya NGO
3. Federal Ministry of Water Resources and Sanitation
4. IFPRI
5. ICRISAT
6. IITA
7. Federal Ministry of Livestock Development
8. Green Habitat Initiative
9. University of Abuja
10. Samahah Investment Limited
11. Bounte Agriculture Limited
12. National Space Research and Development
13. Fedreal Ministry of Environment
14. Nigeria's Governors' Forum

Appendix E. Posters on Innovation Categories.

Innovation categories

Nutrition-sensitive agricultural innovations

- Agricultural practices or technologies designed to improve food production while directly enhancing dietary diversity and nutritional outcomes.
- Example: *Orange-fleshed sweet potato (OFSP) biofortified varieties* that increase vitamin A intake while improving household food production.

Behavior change innovations

- Approaches that motivate and support individuals or communities to adopt healthier, more nutritious, or more sustainable food-related behaviors.
- Example: *Community-led nutrition counseling groups* that use storytelling, peer support, and nudges to encourage healthier child feeding practices.

Food distribution and supply chain innovations

- Solutions that improve how food is stored, transported, processed, and delivered to ensure efficiency, affordability, and reduced loss or waste.
- Example: *Solar-powered cold storage units* that reduce post-harvest losses and keep perishable foods safe during transport.

Climate-resilient food security innovations

- Practices or technologies that help food systems adapt to climate variability and shocks while maintaining reliable and nutritious food supply.
- Example: *Drought-tolerant maize varieties* that maintain yields despite increasing climate variability.

Innovation categories

Strengthening local food systems

- Interventions that enhance the resilience, coordination, and sustainability of locally rooted production, processing, and marketing systems.
- Example: *Community food hubs* that aggregate produce from smallholder farmers, provide basic processing and connect them with local schools, markets, and consumers to keep value and nutrition within the community.

Social protection innovations linked to food and nutrition

- Programs or policies that combine safety nets with nutrition-sensitive support—such as cash, vouchers, or food transfers—to protect and improve food security.
- Example: *Mobile cash-transfer programs with nutrition top-ups* for pregnant women, allowing them to purchase diverse foods.

Digital and data-driven solutions

- Technologies that use mobile tools, sensors, analytics, or digital platforms to improve decision-making, service delivery, or access to food and nutrition information.
- Example: *Mobile advisory apps* that give farmers real-time weather forecasts and crop management recommendations.

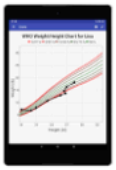
Innovation categories

Market-based innovations

- Business models or market mechanisms that create incentives, products, or services enabling sustainable access to nutritious foods.
- Example: *Nutritious food micro-enterprises* that use affordable business models to sell fortified or locally produced nutritious snacks.

Food safety and regulatory innovations

- Policies, technologies, or systems that improve the safety, quality, and oversight of food from production to consumption.
- Example: *Portable rapid aflatoxin test kits* that help farmers and traders detect contaminated grain on the spot.



Health system delivery innovations

- New models, tools, or processes that strengthen how health services provide nutrition care, counseling, or interventions.
- Example: *Integrated nutrition screening by community health workers* using digital tools to track child growth and refer high-risk cases.

Locally led or Indigenous innovations

- Solutions created, adapted, or governed by local or indigenous communities based on their knowledge, practices, and priorities.
- Example: *Traditional millet-based intercropping systems* developed by Indigenous farmers to protect soil fertility and improve dietary diversity.

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