CGIAR SCALING FOR IMPACT

IWMI International Water Management Institute

Technical Report

Stakeholder Profiling and Innovation Scaling Demand Signaling in Bangladesh

Shreya Chakraborty, Sreejith Aravindakshan, Thai Thi Minh, and Olufunke Cofie

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We extend our sincere appreciation to our partners, stakeholders, and collaborators whose expertise, insights, and commitment have contributed significantly to shaping this work. Their contributions have been instrumental in advancing CGIAR's ambition to scale proven innovations across food, land, and water systems, fostering impact that is inclusive, sustainable, and transformative. We also recognize the continued support and collaboration of national and regional partners, whose engagement ensures that the solutions developed are responsive to local needs, strengthen innovation systems, and contribute to building more resilient agrifood systems.

To learn more about the CGIAR Scaling for Impact Program, please contact:
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CONTENTS

LIST OF TABLES

LIST OF FIGURES

SUMMARY

This report synthesizes findings of eliciting and interpreting demand signals across 11 critical domains of the agrifood system, ranging from nutrition-sensitive agriculture and behavior change to climate resilience and indigenous innovations. These findings are based on analyzing qualitative datasets collected from a workshop organized in Dhaka, Bangladesh, on December 11, 2025, by the International Water Management Institute (IWMI) and International Maize and Wheat Improvement Center (CIMMYT) on Stakeholder Profiling and Innovation Scaling Demand Signaling, under the CGIAR Scaling for Impact (S4I) Science Program. By engaging diverse actors, the session sought to move beyond supply-driven narratives to understand how stakeholders specifically articulate their needs, priorities, and constraints for scaling innovations.
The workshop participants identified three dominant scaling imperatives across the eleven agrifood system domains in Bangladesh: (i) closing systemic infrastructure and production readiness gaps, particularly in post-harvest handling, cold chains, climate-resilient crops, and water management; (ii) strengthening market pull through traceability, food safety compliance, branding, and risk-mitigation mechanisms; and (iii) institutionalizing community-based and behavioural delivery models, including clusters, care groups, cooperatives, and local food hubs, as the primary unit of scaling. These imperatives cut across nutrition, climate resilience, digital systems, market development, and social protection innovations, demonstrating that scaling success depends on ecosystem readiness rather than technology availability alone.

Drawing on participatory profiling, the analysis identifies five core stakeholder groups—Public Sector, Private Sector, Academia, NGOs/Civil Society, and Donors—and reveals distinct patterns in their demand articulation. A key finding is the strategic divergence between sectors: the Public Sector prioritizes "hardware" solutions (infrastructure, high-yielding varieties, embankments), while the Private Sector and Civil Society emphasize "software" mechanisms (branding, consumer behavior, indigenous preservation). Despite these differences, there is strong convergence on the need for cold chain infrastructure and food safety accreditation. The findings highlight robust market pull for specific innovations such as bio-fortified crops (e.g., Zinc Rice, Golden Rice), biopesticides, and climate-smart technologies (e.g., Alternate Wetting and Drying [AWD] irrigation), yet scaling remains constrained by a "missing middle" in the value chain and significant infrastructure deficits.

The report demonstrates that demand in Bangladesh is systemic rather than purely technological. Stakeholders consistently call for "innovation bundles" that integrate physical assets with social and financial mechanisms. Successful scaling requires a hybrid strategy, integrating modernizing production for commercial zones, preserving indigenous assets for vulnerable areas, transitioning financial models from short-term subsidies to long-term market de-risking and institutionalizing community structures as the unit of scaling.

1.0 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 Dhaka, Bangladesh, on December 11, 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.

2. CONCEPTUAL 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).

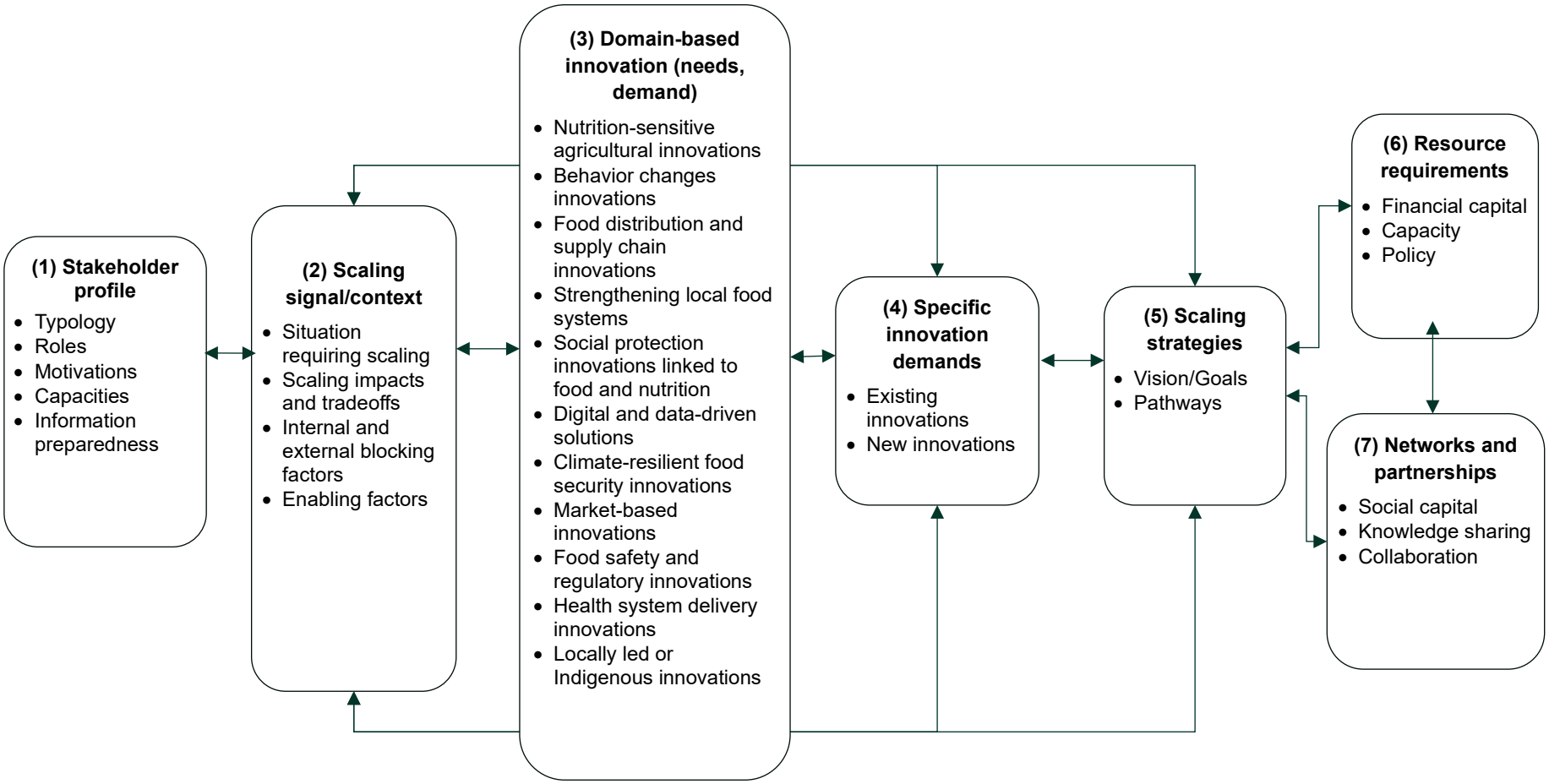

Figure 1. Conceptual framework of innovation and scaling demand signaling

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, Civil Society Organizations (CSOs) and Non-Governmental Organizations (NGOs), and other knowledge partners) and 5) end-users (farmers and their communities).

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Stakeholder 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 vs. external). For example, regulators or policymakers set legal standards for food safety and environmental impact.

Stakeholder 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 adopt it through a cooperative sharing model.

Information preparedness assesses what a stakeholder knows 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 prepared to interpret raw data maps, but the local farmer 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 include 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 identify 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; warehouse space or cold-storage logistics to handle increased yields.

Internal and external blocking factors are the barriers that prevent a stakeholder from adopting or supporting an innovation. These are categorized by whether they originate from within the stakeholder's 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 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 (turning restaurant scraps into animal feed), a network must be built between municipal waste collectors, food safety regulators, processing facilities, and livestock farmers to create an effective value chain.

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3. Methodology

3.1 Data Collection

A qualitative dataset was collected from a one-day, in-person stakeholder engagement workshop, involving about 41 participants (37 men and 4 women) (Annex 1) representing five stakeholder groups:

- Public sector (policy makers, government agencies)
- Private sector and investors
- Research and academia
- Community-based organizations (CBOs) and NGOs
- Development partners and donors

Participatory methods were used, including plenary presentations, brainstorming by rotation in buzz-groups, gallery walks, and group work. 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:

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

3.2 Data Analysis

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

3.3 Scope and Interpretation of the Demand Signaling Evidence

The demand signals presented in this report are derived from a structured, participatory stakeholder engagement process designed to capture diverse institutional perspectives across Bangladesh's agrifood innovation and scaling ecosystem. Participants were purposively selected to represent key public sector agencies, private sector actors, research institutions, civil society organizations, and development partners, enabling in-depth exploration of systemic scaling needs across multiple innovation domains.

Insights reflect articulated priorities and perceived scaling constraints at the time of engagement, synthesized through triangulation of workshop exercises and ODK survey responses to ensure internal consistency. The results therefore provide a robust picture of ecosystem-level demand patterns, strategic bottlenecks, and enabling conditions relevant for guiding innovation portfolio design and scaling pathways.

Given the dynamic nature of policy environments, markets, and climate risks, demand signals should be interpreted as a snapshot of current system priorities and revisited periodically to track emerging needs and evolving opportunities. Complementary integration with household-level, market, and implementation data can further strengthen decision-making for targeted scaling investments.

4.0 RESULTS

4.1 Stakeholder Profiling in Innovation Scaling

Stakeholders participating in this demand signaling exercise comprised representatives from the public sector, private sector, research, civil society, international development organizations, and user associations/groups. The majority of participants represented the public sector, however, the public sector stakeholders comprise both key policy and decision-making departments/ministries as well as the National Agricultural Research and Extension System

institutions (NARES) that provide public sector decision support and recommendations for evidence-based policy making. Beyond this category, stakeholders represented the academic/research, private, international development, and NGO sector.

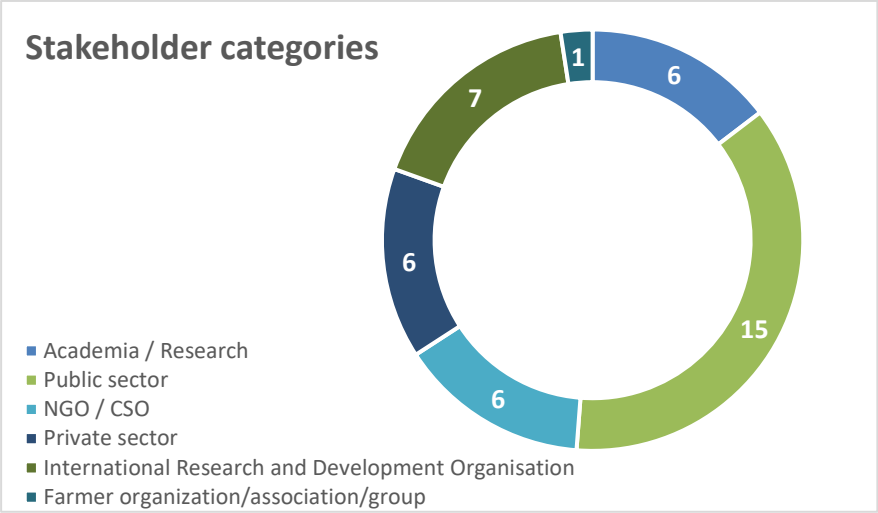

Figure 2. Stakeholder categories by sector participating in demand signaling

In Bangladesh, most of these stakeholder (as seen is figure 3) institutions play multiple roles in the wider innovation and scaling environment. They may take one or more of the roles, such as being innovators and scaling actors, investors financing innovation and scaling, strategic stakeholders supporting innovation and scaling processes sustainably and equitably, facilitators and influencers, or being end-users. The public sector can take the role of being an innovator through the NARES institutions, a scaling agent through its extension departments, as well as an investor through its public programs and schemes. The private sector can take on the role of being an innovator and scaling agent (market) as well as an investor through private funding of its own new varieties of seeds and agricultural machinery. NGOs and civil society organizations play an important role in Bangladesh, providing support as a key actor in local governance with a wide community reach and thus providing scaling support to public, private, and international development innovators. Due to their wide and deep reach in local communities, they also play an effective role as facilitators and influencers for the sustained adoption and use of innovations.

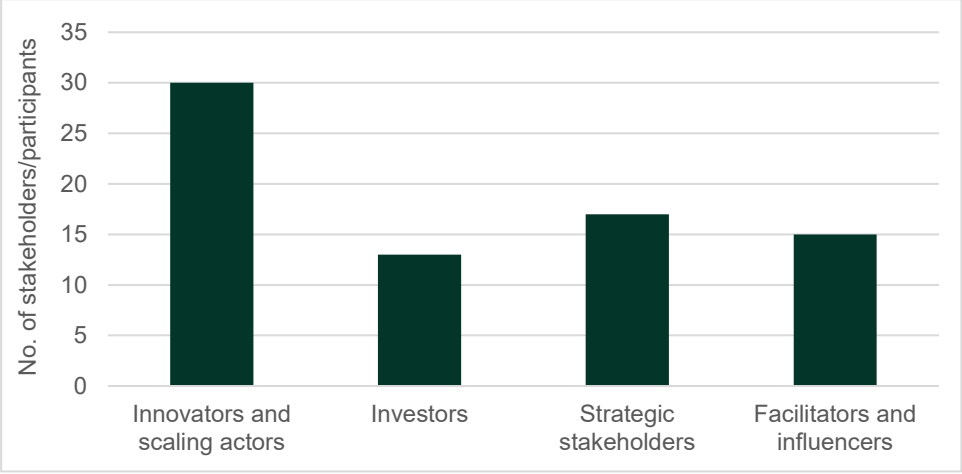

Figure 3. Distribution of stakeholder groups by typology of their roles in innovation scaling

The stakeholder typologies possess differentiated roles, motivations, and capacities. **Innovators and scaling actors** are agenda setters and gatekeepers within the innovation system, leveraging strong institutional and market influence to shape what solutions are prioritized and supported. Their motivations may be anchored in system-wide transformation as well as market integration for creating scaling models for sustained adoption, through the provision of public goods as well as an enabling environment. Their demand signals focus on policy support, regulatory frameworks, subsidies, and shared infrastructure and services that lower systemic barriers to scaling.

Investors were seen to mainly operate as market validators and accelerators of scale, translating innovation potential into financially viable growth trajectories. Investors may come from the private sector, public sector, or the international development arena, each with their own motivations and capacities. While the private sector invests with motivations driven by returns on investment and risk mitigation, the public sector invests with goals of national development impact and resilient economic growth. The international development players invest in improved alignments with global development goals, bilateral or multilateral relations, and priorities. These priorities shape how each player articulates demand. Their capacity lies in mobilizing capital, enforcing performance discipline, and signaling which innovations are ready for investments.

Strategic stakeholders, such as key public sector actors and multilateral agencies with political clout, 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 systems-level demand* for scalable, replicable, inclusive, and digitally enabled solutions that demonstrate measurable impact at scale. Their capacity lies in agenda setting, resource mobilization, and aligning innovation pathways with international and national frameworks and funding priorities.

Facilitators and influencers play a dual role as knowledge brokers and innovation generators, often operating at the interface between research, policy, and practice. Scaling innovations requires significant shifts in narratives, knowledge and understanding, and acceptance of innovations. Influencers and facilitators in Bangladesh play a key role in reducing systemic friction against innovations and changes, which tend to create when widely adopted. They articulate demand for enabling conditions that support research uptake and translation into practice, while seeking clearer downstream signals from markets, communities, and policymakers. Within this group, Farmer-Based Organizations (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.

The demand signals presented here emerge from a mix of all these varied roles and motivations. The public sector is more heavily represented here, given Bangladesh's strongly developed publicly funded development pathways and policy environments, followed by the international development players with their dominant presence in the development trajectories in the country over the past three decades. The private sector has been increasingly significant in the agrifood systems in recent years.

Figure 4 shows the multiple roles and contributions that different stakeholder groups undertake in the larger innovation system, representing the complex of motivations and capacities that feed into demand signals emerging from these stakeholder groups.

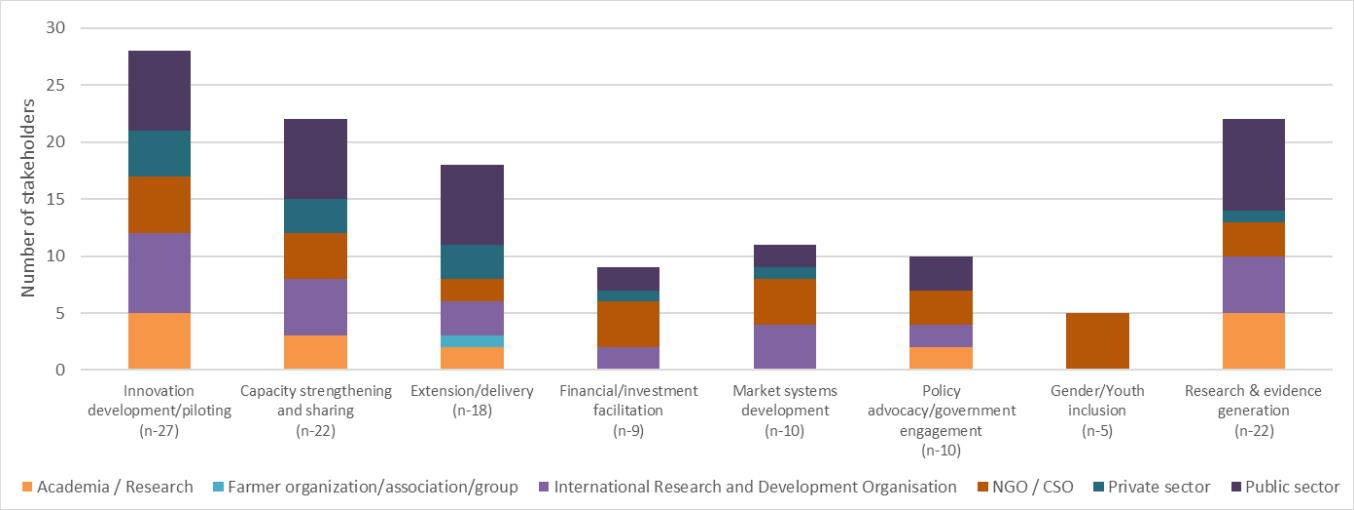

Figure 4. Distribution of stakeholder groups across their specific roles and contributions in the innovation and scaling system

4.2 Scaling Context

Situations Requiring Scaling

Based on the engagement, stakeholders identified several challenges and needs that provide a context or conditions under which scaling is required. Barriers and opportunities for scaling also offer insight into the scaling context and situations.

Solving large-scale/system problems. Scaling is recognized as necessary to resolve deep-seated systemic failures. In the Bangladesh agrifood systems, stakeholders identified key failures in nutrition and public health, environment, as well as critical infrastructure and supply chain development. Predominantly, stakeholders recognize that the system struggles with "hidden hunger" due to micro-nutrient deficiency and non-diversified diets. A major health risk is the chemical pesticides and unsafe fruit ripening practices, necessitating a shift to safe food compliance and safe cooking practices. Urgent large-scale solutions are needed for deepening environmental and climatic crises faced in southern coastal areas, facing high salinity and cyclones, drought, and heat in Barind, creating systemic water scarcity with declining freshwater fish populations and a lack of irrigation water. The widespread food loss and wastage, as well as high production costs, are caused by a systemic gap in physical and logistical supply chain infrastructure, such as the absence of essential post-harvest facilities, cold storage, poor rural road connectivity, and low investments in food distribution and market connection.

Scaling ready-to-scale innovations. Stakeholders also identify many existing innovations that are existing and ready to scale. There is an immediate operational demand to scale these proven technologies that address productivity and infrastructure gaps. To combat post-harvest losses and the lack of storage, ready solutions include Zero Energy Cool Chambers (ZECC), solar dryers for mango and tomato, and axial blowers for onion storage. Supply chain scaling is required for packhouse models with cold storage and low-cost refrigerated tricycles. In production, the context requires scaling stress-tolerant seed varieties, specifically flood-tolerant rice (BRRI dhan51, 52), drought-tolerant maize, and salt-tolerant wheat and vegetables.

Essential machinery ready for scaling includes solar-powered pumps and efficient irrigation technologies like Alternate Wetting and Drying (AWD).

Seizing opportunities. Stakeholders also recognize several opportunities that the environment presents for growth and transformation that require scaling to capture value. Firstly, the emerging digital transformation offers opportunities to scale digital tools, including GIS and remote sensing for crop monitoring, mobile advisory apps, and AI-driven crop diagnosis. Further, the emerging export opportunities and high-value domestic markets for agrochemical residue-free vegetables create demand for “traceability" and "premium fair" collection points. Emerging markets for medicinal and other multi-use crops, carbon credits, etc., allow for new areas of innovation, scaling demands.

Triggering system changes. Demand also emerges for practices and scaling efforts to alter behaviors, cultures, and business models to trigger critical system changes. Stakeholders identify the prevalence of "conservative thinking" regarding innovation adoption, often fueled by superstition about the potential negative effects of innovations, with many people unwilling to try new practices. Beyond economic rationality, scaling efforts are also demanded to consider religious, cultural, or social perceptions that hamper innovation adoption. Inclusive institutional innovations such as "gender-transformative dialogues." "women’s nutri-hubs," and youth-managed systems to create an inclusive business environment can thus trigger significant systems shifts. System change also requires validating and scaling "indigenous traditional knowledge" and locally led innovations like seed banks to reduce reliance on external commercial inputs.

The data reveals a divergence in perspective. The public sector has focused more on physical infrastructure gaps and macro-level climate management needs. The private sector focused on market dynamics and consumer psychology. Universities have been on needs for regulatory rigor and technical data, while NGOs have focused on social equity, indigenous knowledge, and behavioural nuance.

Internal Blocking Factors. Internally, a primary blocker is behavioral, motivational, cultural barriers, and "conservative thinking" regarding innovation adoption, where individuals are unwilling to try new practices. Adoption is often stalled by resistance to change and low motivation. This resistance is often reinforced by perceptions and narratives about the potential negative consequences, its economic value, inconvenience of using an innovation, as well as religious, cultural, and social perceptions that hamper behavior change. A pervasive lack of awareness and technical knowledge further exacerbates this; growers lack knowledge of proper biopesticide application, farmers are unaware of the benefits of biofortified crops, extension personnel lack adequate technical knowledge about efficient irrigation technologies, and traders lack knowledge regarding food safety. Capacity and skills deficit can also block innovation scaling. Biopesticides require "skilled manpower to apply" them effectively. Similarly, precision agriculture and farm automation are blocked by a "lack of skilled manpower" to operate advanced systems. Broadly, "capacity" issues are noted for climate-resilient crops. Even for water testing kits, the maintenance is hindered because "if anything goes wrong, skilled technicians are not always available."

External Blocking Factors. Externally, the scaling of innovations is physically obstructed by severe *infrastructure and technical deficits*, including the lack of rural road communication and the absence of cold storage, reefer vans, and packhouses necessary for perishable supply chains. Aspects such as “weak internet connectivity", "limited availability of equipment,", and missing

market linkages have been identified. *Economic constraints* act as a major external factor, characterized by high production costs, the limited affordability of inputs like biopesticides, and the high cost of water testing kits. The "political economy" is explicitly identified as a force that may promote some innovations while actively hampering others to protect commercial interests. *Market and regulatory failures* further impede progress, including the presence of "counterfeit formulations" (e.g., of biopesticides), a lack of strict implementation of food policies, unfavorable pricing systems, and a shortage of skilled manpower to enforce these regulations. Finally, *environmental and climatic factors*, specifically high salinity, drought, flash floods, and a lack of safe drinking water, render standard agricultural interventions ineffective in vulnerable regions.

Critical Enabling Conditions for Successful Scaling. The most critical enabling factor currently present in Bangladesh is the established regulatory and policy framework. Stakeholders explicitly note the existence of foundational food safety regulations and an active Good Agricultural Practices (GAP) protocol, creating a ready-made compliance pathway for safety-focused innovations like biopesticides and fruit ripening technologies. This legal architecture is supported by a government policy environment that actively utilizes subsidies for agricultural inputs, providing a financial mechanism that is already structured to support the introduction of new tools, such as water testing kits, without needing to create new funding channels from scratch.

Complementing the regulatory framework is a *robust market environment* characterized by clear *economic incentives*. For instance, the drive to reduce national dependency on imported chemical pesticides creates a favorable macroeconomic climate for scaling domestic biopesticide solutions. Simultaneously, the export potential for high-value, residue-free produce generates immediate commercial demand for safety innovations. At the consumer level, the environment is enabled by cost competitiveness; some innovations like fortified rice are positioned to scale because they share the same average market price as existing varieties.

The operational and technical landscape further supports scaling through *compatibility and available human capital*. Bangladesh possesses a significant reserve of technical skill within engineering universities and agricultural companies, providing an intellectual infrastructure to adapt and maintain innovations. Operationally, adoption barriers are low because many innovations fit seamlessly into current practices; for instance, biofortified rice requires the same management procedures and offers the same taste profile as popular varieties, requiring no behavioral upheaval for farmers or consumers. Additionally, the widespread availability of digital hardware, such as IoT devices and sensors, alongside vast tracts of suitable irrigated land, provides the physical and digital infrastructure necessary to deploy precision agriculture and climate-resilient crops immediately.
Finally, the enabling environment is reinforced by a strong alignment with sustainability goals. The existing agricultural landscape is increasingly valuing eco-friendly and sustainable practices, creating a "push" factor for innovations that produce no carbon emissions. This alignment opens pathways for utilizing emerging financial instruments like carbon credit markets. The combination of these environmental priorities with the potential to convert fallow land and improve livelihoods creates a holistic support system where innovations are viewed not just as tools for production, but as essential components of national climate resilience and food security strategies.

4.3 Domain-Based and Specific Innovation Demand Signaling

This section captures stakeholders' needs, demands/wants in relation to the relevant innovation domains. The method for the demand signaling in this engagement categorizes demands under different components of the agrifood system.

- Nutrition-sensitive agricultural innovations
- Behavior changes innovations
- Food distribution and supply chain innovations
- Strengthening local food systems
- Social protection innovations linked to food and nutrition
- Digital and data-driven solutions
- Climate-resilient food security innovations
- Market-based innovations
- Food safety and regulatory innovations
- Health system delivery innovations
- Locally led or Indigenous innovations

In assessing stakeholder "wants," it is found that stakeholders often articulate demands not only for specific innovations but, in many cases, for broader systemic solutions (without identifying or recognizing a particular innovation associated with that solution) as well as for an enabling environment that strengthens support for solutions and innovations.

Nutrition-sensitive agricultural innovations. Stakeholders demand a multi-layered approach involving *systemic solutions* like the advanced processing of food and the creation of value-added products that fortify all required nutrients into a single product. There is a call to bridge the gap between availability and desire; this includes ensuring the physical availability of seeds, identifying Good Agricultural Practices (GAP) through models like Better Life Farming, and ensuring nutrients are cost-effective for the masses. *Specific innovations* ready for scaling focus heavily on bio-fortification, including Zinc-biofortified rice (BRRI dhan74, 84), Golden Rice (provitamin A), provitamin A maize for feed, and high-iron lentils. To enable this, stakeholders want a robust enabling environment characterized by strong branding, media campaigns, and training for mothers on preparing nutritious yet tarty food to compete with unhealthy options. This environment also requires policy actions to reduce the availability and advertising of unhealthy foods, alongside the implementation of nutrition diet tracking systems in schools.

Behavior changes innovations. The demand here is for a shift from rational to anthropological models. *Systemic solutions* include refining food cultures and habits, borrowing strategies from marketing science to influence psychological behavior, and promoting a paradigm shift toward biorational farming. *Specific innovations* to scale involve Healthy Plate campaigns, Care Groups with gender-transformative dialogues, village nutrition champions, and cooking demonstrations using local ingredients. The *enabling environment* demands include profiling target groups to understand specific needs, school-based campaigns that turn students into peer champions, and continuous government advertising to normalize nutritious diets. Furthermore, adoption depends on ensuring physical and economic access to these innovations, limiting usage costs, and utilizing digital tools to make them understandable to users.

Food distribution and supply chain innovations. Demands are dominated by larger infrastructure needs, specifically the development of packhouses, multi-purpose cold storage,

and temporary low-temperature storage facilities. Logistics require strengthening rural road communication and deploying reefer vans. *Systemic demands* also include adopting nature-based solutions and renewable energy innovations to power this infrastructure. *Specific innovations* ready for scaling include Zero Energy Cool Chambers (ZECC), solar dryers for mango/tomato, axial blowers for onions, low-cost refrigerated tricycles, and mobile vending units equipped with hygiene kits. The *enabling environment demands* calls for accreditation institutes, scaling up local markets with hygiene standards, and the development of low-cost, safe ripening chambers to replace toxic practices. Additionally, stakeholders emphasize the need for aggregation hubs specifically for women vendors to ensure inclusive market access.

Strengthening local food systems. *Systemic solutions* focus on shortening the distance between production and consumption through market linkages and establishing local food hubs that connect producers directly to institutional buyers. There is a demand to introduce organic and conservation agriculture, alongside high-yielding and short-cycle crop varieties. *Specific innovations* include floating gardens for flood-prone zones, integrated rice-fish-duck systems, community aquaponics managed by youth, urban rooftop gardening, and organic sack gardening. The *enabling environment demands* include adequate subsidies to stimulate uptake and the establishment of farmer-managed seed banks to preserve local genetic diversity.

Social protection innovations linked to food and nutrition. Stakeholders want *systemic solutions* that identify real vulnerable groups to prevent leakage and ensure a supply of safe, fortified (Zn/Fe) food products. There is a demand to develop linkages between policymakers and stakeholders and to ensure access to healthy foods at affordable market prices. *Specific innovations* for scaling include school meal programs using zinc rice/eggs, conditional food vouchers for pregnant women, asset transfers (poultry/fingerlings) linked to nutrition counselling, community food banks, and cash-for-work programs integrating home gardening. The *enabling environment demands* include sustainable funding models, the formation of common selling centers, rigorous monitoring of nutritional status, and the provision of subsidized vegetable seed kits to low-income households.

Digital and data-driven solutions. Demands center on precision and information flow. *Systemic solutions* include GIS-based surface water assessment, automated groundwater monitoring, and early digital signaling systems for weather, pests, and flooding. *Specific innovations* include Geo-nutrition dashboards, mobile advisory apps, IoT-based sensor-driven irrigation, AI-based crop diagnosis apps, and near real-time fisheries analytics systems. The *enabling environment demands* include policy optimization tools (PoLOPT), personalized weather forecasting, digital soil mapping, and low-cost digital technologies that ensure inclusivity. Stakeholders also highlight the need for QR code-enabled traceability for fish and vegetable markets to build consumer trust.

Climate-resilient food security innovations. This domain has the most extensive demands. *Systemic solutions* include water conservation in hilly regions through high-capacity solar pumps and dams, resilient production technologies, and organic farming. Stakeholders also call for hard infrastructure like strong embankments, salinity barriers, and safe drinking water supplies. *Specific innovations* ready to scale are flood-tolerant rice (BRRI dhan51/52), drought-tolerant maize, salinity-tolerant vegetables, solar-powered cold rooms, climate-resilient livestock breeds, and efficient irrigation like AWD. The *enabling environment demands* carbon credit programs, incentives for scaling, the development of historical climate scenarios, and soil amendments using organic manure and biochar.

Market-based innovations. *Systemic solutions* focus on establishing traceability for residue-free vegetables and marketing these safe products effectively. *Specific innovations* include Women's Nutri-Hubs, franchise models for healthy street food, inclusive fish value chains serving the urban poor, small-scale fortification enterprises, and subscription-based food baskets. The *enabling environment demands* include Public-Private Partnerships (PPPs), risk insurance, farmers' markets with nutrition labelling, and collaborative centers, such as the Better Life Centre, for information dissemination on agrochemical residues.

Food safety and regulatory innovations. Stakeholders demand *systemic solutions* such as the strict implementation of food policy, the revision of existing regulations, and the establishment of storage infrastructure by all sectors. *Specific innovations* include low-cost MRL testing kits for local markets, biological aflatoxin control, mobile food safety reporting systems, hygiene grading schemes for informal markets, and HACCP-compliant packaging. The *enabling environment* requires the availability of biopesticides, phytosanitary measures, and improved cooking processes to preserve nutrients. A practical household-level enabler suggested is the use of a salt solution to reduce pesticide residues.

Health system delivery innovations. *Systemic solutions* involve a One Health policy and temperature-controlled food vans for safe transport. *Specific innovations* to scale are mobile tools for IYCF counselling, nutrition education modules in health centers, growth monitoring linked to agriculture, and micronutrient supplementation linked to diet counselling. The *enabling environment demands* comprehensive advisory services on nutrition and diets, nutrition-sensitive community health worker programs, and the implementation of nutritional and organic school lunch programs.

Locally led or Indigenous innovations. *Systemic solutions* focus on identifying and preserving indigenous innovations to reduce reliance on commercial seeds. *Specific innovations* include promoting small indigenous fish (mola), women's groups preserving traditional leafy vegetables, traditional fermentation techniques, and local grain milling cooperatives for fortified flour. The *enabling environment* demands include establishing local seed banks and community gene banks, creating market linkage points for premium local fare, and organizing indigenous food festivals to validate and promote traditional diets.

Table 1. Summary of demands for solutions, specific innovations, and demands for enabling environment aspects to support wider scaling of solutions

Innovation Domain	***Systemic Solutions*** *(Structural & Broad solution demands)*	***Specific Innovations*** *(Ready to Scale*)*	***Enabling Environment Demands*** *(Policy, Funding, Behavior)*
1. Nutrition-sensitive agricultural innovations	- Advanced processing technology - Fortification of all required nutrients in one product - Value-added product innovation - Identification of GAP (e.g., Better Life Farming) - Cost-effective nutrients	- Zinc-biofortified rice (BRRI dhan74, 84) - Golden Rice (provitamin A) - Pro-vitamin A maize (poultry/livestock feed) - High-iron lentil varieties	- Awareness, knowledge, and branding of biofortified crops - Training mothers on "tarty" nutritious food - Reducing ads for/availability of unhealthy food - Media campaigns for children's nutrition - Nutrition diet tracking systems in schools
2. Behavior changes innovations	- Shift to anthropological models	- "Healthy Plate" campaigns - Care Groups with gender-transformative dialogues	- Physical and economic access to innovations - Limiting costs to use innovations

	- Refining food culture/habits - Marketing science strategies for psychological behavior - Shift to biorational farming - Cluster-based activity models	- Village nutrition champions (peer educators) - Cooking demonstrations (local veg/fish) - School kitchen gardens	- Profiling target groups for tailored needs - Continuous government advertising - School-based campaigns (students as "champions") - Digital tools to make innovations understandable
3. Food distribution and supply chain innovations	- Packhouse development at production hubs - Multi-purpose cold storage - Temporary low-temp storage facilities - Strengthening rural road communication - Nature-based & renewable energy solutions	- Zero Energy Cool Chambers (ZECC) - Solar dryers (mango/tomato) - Axial blowers for onion storage - Low-cost refrigerated tricycles - Mobile vending units with hygiene kits - Aggregation hubs for women vendors	- Accreditation institutes - Scaling up local markets with hygiene standards - Low-cost and safe ripening chambers - Value-added processing facilities (SMBs)
4. Strengthening local food systems	- Market linkages (producers to markets) - Introduction of organic and conservation agriculture - High-yielding & short-cycle variety innovations - Safe food production innovations	- Floating gardens in flood-prone zones - Integrated rice–fish–duck systems - Community aquaponics (youth-managed) - Urban rooftop gardening with hydroponics - Organic sack gardening	- Adequate subsidies to stimulate uptake - Farmer-managed seed banks - Local food hubs linking producers to institutional buyers -
5. Social protection innovations	- Identification of "real" vulnerable groups - Supply of safe, fortified (Zn/Fe) foods - Linkage development (policy/stakeholders) - Formation of common selling centers	- School meal programs (zinc rice/eggs) - Conditional food vouchers (pregnant women) - Asset transfers (poultry/fingerlings) linked to BCC - Community food banks - Cash-for-work integrating home gardening	- Sustainable funding models - Access to healthy foods at affordable market prices - Rigorous monitoring of nutritional status - Subsidized vegetable seed kits for low-income households
6. Digital and data-driven solutions	- Automated groundwater monitoring - GIS-based surface water assessment - Early digital signaling (weather, pests, flood) - Season-specific advisory services	- Geo-nutrition dashboards - Real-time dashboards (diet diversity/prices) - Near Real-Time Fisheries Analytics System - Mobile advisory apps - IoT-based sensor-driven irrigation (AWD) - AI-based crop diagnosis apps	- Low-cost technology (inclusivity) - Digital soil mapping (organic/physical content) - Policy optimization tools (PoLOPT) - QR code-enabled traceability - Ensuring farmer access to digital platforms
7. Climate-resilient food security innovations	- Water conservation (hilly regions/dams) - Resilient production technologies - Organic farming & Low emission rice production - Strong embankments, salinity barriers, safe water - High-capacity solar pumps	- Flood-tolerant rice (BRRI dhan51, 52) - Drought-tolerant maize - Salinity-tolerant veg/wheat varieties - Solar-powered cold rooms - Resilient livestock/fish breeds - Efficient irrigation (AWD, sprinkler, drip)	- Carbon credit programs - Incentives to scale innovations - Historical & climate scenario projections - Soil amendments (biochar, organic manure) - Green manuring crops (e.g., Dhaincha) - Ozone-tolerant & Photo-insensitive varieties

8. Market-based innovations	- Traceability of residue-free vegetables - Marketing of safe products - Value addition (food systems) - Better Life Centre (Bayer) information hubs	- Women's Nutri-Hubs - Franchise models for healthy street food - Subscription-based veg/fish baskets - Inclusive fish value chains - Small-scale fortification enterprises	- Public Private Partnerships (PPP) - Introducing risk insurance for farmers - Strong public-private collaboration - Farmers' markets with nutrition labelling
9. Food safety and regulatory innovations	- Strict implementation/ revision of food policy - Storage infrastructure (Govt/NGO/Private) - Biorational approach adoption - Improving cooking processes (nutrient preservation)	- Low-cost MRL testing kits (local markets) - Low-cost water and soil testing kits - Biological control of aflatoxins - Mobile food safety reporting systems - HACCP-compliant packaging - Hygiene grading schemes	- Availability of biopesticides - Phytosanitary and quarantine measures - Biopesticide-based IPM packages - Good Agricultural Practices (GAP) - Household use of salt solution to reduce MRL
10. Health system delivery innovations	- "One Health" policy - Temperature/humidity-controlled food vans	- Mobile tools for IYCF counselling - Nutrition education modules in health centers - Growth monitoring linked to agriculture - Micronutrient supplementation linked to counselling - Integrated counselling (antenatal/postnatal)	- Nutrition-sensitive community health worker programs - Comprehensive advisory services on nutrition/diets - School lunch programs (nutritional and organic)
11. Locally led or Indigenous innovations	- Identifying indigenous innovations - Access to locally preserved seeds - Reducing over-reliance on commercial seeds	- Promotion of small indigenous fish (mola) - Women's groups preserving leafy vegetables - Farmer-led seed networks (zinc rice) - Traditional fermentation techniques - Local grain milling cooperatives	- Establishing local seed and community gene banks - Market linkage points for premium local fare - Indigenous food festivals - Aligning external innovations with indigenous knowledge

* *as reported by stakeholders*

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4.4 Patterns of Demand by Stakeholder Group

The assessment of specific wants and innovation priorities reveals distinct divergence in how different stakeholder groups perceive the challenges of scaling. Each group views the food system through a unique operational lens, resulting in a patterned set of demands that range from heavy infrastructure to behavioral nudges.

The *Public Sector's* demands are predominantly structural, physical, and production-oriented, viewing the scaling challenge primarily as a logistical and biological deficit that requires hardware solutions. Their priorities focus heavily on constructing the physical foundations of the food system. Specifically, they demand the strengthening of rural road communication, the development of packhouses at production hubs, the construction of protective embankments and dams, and the dissemination of high-yielding, stress-tolerant crop varieties. Their strategic orientation is focused on volume and connectivity.

In contrast, the *Private Sector* focuses on the "software" of the system, i.e., consumer psychology, marketability, and profitability, and prioritizes transforming how products are

perceived, sold, and valued. Key demands include refining consumer habits, such as shifting children's preference from "tarty" processed foods to nutritious options, creating value-added products, and establishing traceability systems to justify premium pricing. They also seek to de-risk business operations through insurance and franchise models. Their strategic orientation targets profitability and desirability, aiming to de-risk the market environment and create "pull" factors from consumers rather than just "pushing" technology to farmers.

The *Academic group*'s demands are characterized by a demand for precision, data rigor, and governance to ensure standardization and verification. Their inputs appear to prioritize the strict implementation of food policies, the establishment of testing infrastructure, i.e., MRL kits and water testing facilities, and the deployment of "One Health" policies. They have also focused on cost-effectiveness and precise data assessments using tools, i.e., GIS and remote sensing. Their strategic orientation is centered on standards and evidence, ensuring that scaling efforts do not compromise safety or scientific validity, thus acting as a check against unregulated expansion.

NGOs and CSOs prioritize equity, indigenous assets, and human-centric approaches, often challenging industrial or commercial models in favor of local, nature-based, and inclusive solutions. Their demands focus on identifying "real" vulnerable groups to prevent leakage, preserving indigenous knowledge through mechanisms like seed banks, empowering women's groups, and promoting low-cost, nature-based solutions like sack gardening over high-tech inputs. Their strategic orientation emphasizes inclusion and resilience, advocating for "bottom-up" scaling that relies on local resources rather than external commercial dependencies.

Donors have tended to focus on future-proofing, financial sustainability mechanisms, and filling investment gaps that other sectors cannot address. They look for high-level leverage points to transition the system toward long-term goals. Their key demands include financial mechanisms such as carbon credits and risk insurance, long-term resilience planning through historical climate scenarios, and the facilitation of PPPs. Their strategic orientation is focused on sustainability and leverage, prioritizing mechanisms that allow innovations to sustain themselves financially without perpetual aid.

4.5 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 categorized 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 (table 2).

Table 2. Categorization and listing of scaling strategies identified by stakeholders

Strategy and Resource Pillars	***Specific Strategies Identified***
1. Policy and Institutional Integration	- Policy Formulation & Guidelines: Developing specific policies for new technologies (e.g., water testing) and streamlining policy formulation for inputs like biopesticides. - Regulatory Simplification: Creating easy registration processes for bio-inputs and securing government "environmental certificates" (e.g., for Golden Rice). - Institutional Mandates: Engaging national bodies (DAE, DOF) to include innovations in their standard development programs and engaging extension offices for pilot distribution. - Standardization: CGIAR and government collaboration to develop clear guidelines and protocols.

2. Financial Structuring and Incentives	- Global Climate Funds: Actively seeking funds from international mechanisms like GEF, GCF, and Global Shield. - Risk Mitigation: Providing climate risk insurance funds to de-risk adoption for farmers. - Revenue Generation Models: Introducing carbon credit programs (specifically for AWD) and framing technologies as money for farmers to demonstrate ROI. - Direct Financial Support: Subsidization of inputs (biopesticides, ZECC) and linking farmers with micro-finance institutions or providing direct financial support to innovative adopters.
3. Capacity Building and Social Awareness	- Visual Proof: Conducting rigorous field demonstrations (e.g., for biopesticides, fruit ripening) to build trust. - Mass Media Campaigns: Utilizing TV, social media, and workshops to motivate public perception and create awareness among growers and policymakers. - Skill Development: Continuous capacity building for growers and producers on application techniques. - Feedback Loops: Establishing monitoring and feedback mechanisms to refine deployment.
4. Collaborative R&D and Networks	- Initiating prototype development through partnerships between Donors (funding), Universities (research), and the Private Sector (scaling). - Public-Private Partnerships (PPP): Strengthening PPPs to de-risk infrastructure and value chains. - Continuous Improvement: Academia-industry collaboration to refine technologies and conduct further research for commercialization.
5. Operational Deployment and Delivery Models	- Collective Adoption: Developing group or community-based adoption modalities (e.g., for AWD and ZECC) rather than individual targeting - Smart Automation: Direct deployment of internet-based farm automation, smart irrigation, and smart housing systems (poultry/cattle/fish). - Supply Chain Logistics: Establishing effective last-mile supply chains and increasing the physical supply/availability of seeds. - Pilot Distribution: Targeting specific local government offices (Upazila/Union level) for initial pilot rollouts.

Emerging from these strategy pillars, we can gauge four broad demanded pathways for scaling – institutional pathways (PPP or public), commercial pathways (through markets), digital pathways, and social/behavioral pathways. Different mechanisms are identified by stakeholders to support the scaling of innovations in a sustained manner.

Table 3. Scaling pathways

Pathway	*Focus Area*	*Key Strategic Mechanisms*
Institutional (public or PPP)	Infrastructure & Regulation	Accreditation institutes, Cluster-based models, PoLOPT tools, DAE networks.
Commercial	Profitability & Markets	Carbon credits, Risk insurance, Traceability premiums, Franchise models.
Digital	Efficiency & Precision	User profiling, AI/Mobile advisory, Geo-data targeting.
Social/Behavioral	Habits & Inclusion	Peer champions, Student champions, Indigenous validation, Field/Cooking demos.

4.6 Networks

The demand signaling exercise also seeks to understand key partner networks that were crucial to support innovation scaling. The stakeholder engagement revealed some critical partnerships and networks -

- Institutional Delivery and Extension Networks include Department of Agricultural Extension (DAE), Better Life Farming Centers, Department of Fisheries (DOF) Extension Offices, Accreditation Institutes, and Certification Bodies
- Community and Social Influence Networks such as Care Groups, Village Nutrition Champions and Student Champions, Cluster-based Farmer Groups and Water User Groups

- Financial and Risk Management Networks, including Micro-Finance Institutions (MFIs), Global Climate Finance Bodies (GEF, GCF, Global Shield), Carbon Credit Platforms
- Research and Strategic Networks such as Universities-private Sector-donor nexus, Engineering Universities (for technical manpower), and CGIAR System (for policy and technical development)

Through the structured ODK survey, participants were asked to identify and rank key partners they consider most crucial for innovation scaling (lower ranks representing a higher value of crucial network). Averaging out the ranks to broadly assess comparative importance assigned to different categories of partners in innovation scaling, it is seen that national ministries and local governments are considered most relevant and critical for networks supporting innovation scaling. This is followed by the private sector, farmer organizations, and NGOs/CSOs. Universities, International development and aid agencies, and think tanks were considered relatively less critical partners in the overall networks supporting scaling by stakeholders.

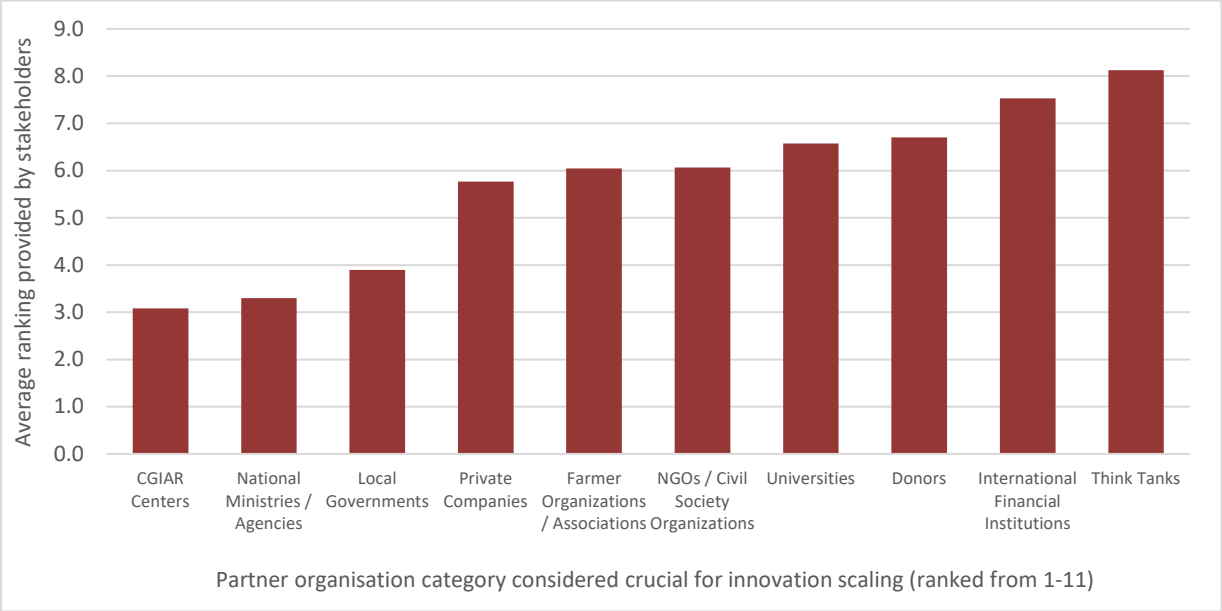

Figure 5. Average ranking of other key partnerships considered crucial for innovation scaling by stakeholders
Source: Generated by Authors

4.7 Implications of the Workshop Insights for Innovation Demand

1. *Demand is systemic*: Stakeholder demands rarely target single technologies; instead, they point to bundles of technological, institutional, and financial innovations. Stakeholders, while articulating demand, do not merely demand innovations, but also larger systemic solutions and enabling environment support for sustained scaling of these innovations.
2. *Divergences in demand from different stakeholders emanate from varied mandates and motivations*: A distinct difference exists between the public sector's push for technological and infrastructural modernization and civil society's focus on localization, thus necessitating different or balanced pathways for commercial versus vulnerable contexts. Similarly, public sector investments in physical hardware demand risk failure if not simultaneously paired with private sector "software" demands like branding, traceability, and consumer psychology.

3. *Demands can reveal potential scaling pathways, not only innovation prioritization*: For instance, this engagement revealed that stakeholders are articulating a sophisticated demand for financial tools that go beyond traditional subsidies. The recurring mention of "climate risk insurance," "carbon credits," "sovereign risk funds," and "accreditation" signals that the primary barrier to scaling is not just cost, but risk, and thus de-risking can be a more potent pathway to scaling than simply subsidizing or accessing financial resources.
4. *Scaling is Social, Not Individual*: The repeated demand for "Cluster-based models," "Care Groups," and "Village Champions" indicates that the unit of scaling in Bangladesh is the *community*, not the individual farmer.

4.8 Recommendations

- Adopt a hybrid scaling strategy that promotes high-yield commercial solutions for intensive zones while simultaneously preserving indigenous assets for vulnerable populations. Balancing the demands of differential pathways from different stakeholders can lead to effective scaling mechanisms, such as balancing the public sector's infrastructure focus with the private sector's focus on market-pull, consumer perceptions, and narratives.

- Holistic Packaging: Bundle innovations so that physical assets are coupled with soft mechanisms to ensure market trust and consumer acceptability. Scaling strategies cannot be siloed. A cold storage facility (Public demand) needs an accreditation system (Donor demand) and a traceability model (Private demand) to function effectively. Innovation packages must bundle hardware with market mechanisms.

- Community Scaling: Shift deployment focus from individual farmers to collective units—such as clusters and Care Groups—to achieve necessary economies of scale and peer trust.

- Market-Building Finance: Scaling efforts should shift funding from direct asset transfers and subsidies to market-building mechanisms (insurance, guarantees, credit scoring) that allow farmers and SMEs to invest in scaling safely.

- Demand-Led R&D: Reorient research prioritization to align with "market pull" signals from the private sector rather than relying solely on "technology push" from research institutions.

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Annex 1. Results of Innovation Demand Exercise

1. Nutrition-sensitive agricultural innovations

Needs/challenges

- Group 1: Public sector
  - Post-harvest (milling) loss
  - Micro-nutrient deficiency
  - Lack of awareness of bio-fortified crops
  - Low interest in high-yielding biofortified crop varieties from farmers
  - Limited advanced crop and soil management
  - Climate-resilient queen breeding station
- Group 2: Private sector (originally pasted under behavior change)
  - Refine the habits and food culture of children to change the food patterns of children
  - Lack of knowledge about balanced nutrition
  - Paradigm shift from toxic chemical pesticides to biorational pesticides
  - Children like to eat tarty food instead of nutritious food
  - Proper child nourishment
- Group 3: Universities
  - Social compatibility
- Group 4: NGOs/civil society (originally pasted under behavior change)
  - Our diets are not diverse and create challenges for children and adults

Wants

- Group 1: Public sector
  - Awareness and knowledge
  - Availability of seeds
  - Branding
  - Advanced processing technology
  - Solution: GAP identification (better life farming)
- Group 2: Private sector (originally pasted under behavior change)
  - Solution: Reduce the availability of XX food and related advertisements
  - Solution: Proper training for mothers on how to make tarty nutritious food for their children
  - Solution: ensure nutritious food in school meals
  - Solution: media campaign on nutritious food for children
- Group 3: Universities
  - Cost-effective nutrient

Innovations to scale

- Examples (listed by us):
  - Zinc-biofortified rice (BRRI dhan74)
  - Zinc-biofortified rice (BRRI dhan84)
  - Golden Rice (provitamin A)
  - Pro-vitamin A maize for poultry feed
  - Pro-vitamin A maize for livestock feed
  - High-iron lentil varieties for household consumption
- Group 1: Public sector
  - Value-added product innovation
  - Innovation of all the required nutrients in one product through fortification
- Group 2: Private sector (originally pasted under behavior change)
  - Food innovations to make nutritious good tartier
  - Nutrition diet tracking system in school

2. Behavior changes innovations

Needs/challenges

- Group 1: Public sector
  - Lack of awareness and knowledge about the benefits of innovations. For example, small fish are more nutritious than big fish.
  - Religious, cultural, and social perception hampers behavior change
  - Conservative thinking of innovation adoption, not many people are willing to try new practices
  - Commercial influence and political economy will promote some innovations but hamper other innovations
- Group 4: NGOs/civil society
  - Behavior change focuses a lot on rational decisions and incentives, while most people change behavior based on other factors
- Group 5: Donors
  - Superstition about what could happen if an innovation is used

Wants

- Group 1: Public sector
  - Users need to have physical and economic access to innovations
  - Use of digital tools and platforms to make innovations understandable to users
  - Identification of target groups for specific innovations, which means you need to profile different target groups and know what they need and want
  - Solution: continuous advertising by the government
  - Solution: development of models
  - Solution: arrange demonstrations on nutritious crop production in farmers' fields
- Group 2: Private sector
  - Solution: limit costs to use innovations
  - Solution: mass media publications
- Group 4: NGOs/civil society
  - Solution: focus on school-based campaign, make student a “champion” to shape peers
- Group 5: Donors
  - Consider anthropological aspects
  - Consider indigenous traditional knowledge and ensure that innovations are in line with that knowledge for easy adoption

Innovations to scale

- Examples (listed by us):
  - Cooking demonstrations using local vegetables, fish, and lentils
  - “Healthy Plate” campaigns in schools and rural markets
  - Care Groups with gender-transformative dialogues
  - Media campaigns on reducing ultra-processed food consumption
  - Village nutrition champions (peer educators)
  - School kitchen gardens with nutrition
- Group 1: Public sector
  - Cluster-based activities model
- Group 2: Private sector
  - Biorational farming
- Group 4: NGOs/civil society
  - Borrow innovations from marketing and behavior science to influence both the rational mind and psychological behavior

3. Food distribution and supply chain innovations

Needs/challenges

- Group 1: Public sector
  - Rural road communication needs to be developed

    - A packhouse or collection center is essential
    - No referral can facilities to transfer of fresh fruits and vegetables
    - No storage facilities for fresh horticultural crops
- Group 5: Donors
    - Limited infrastructure: cold storage, reefer van, packaging, etc.
    - Limited investment in proper food distribution and supply chain

Wants

- Group 1: Public sector
    - Road communication in remote rural areas needs to be strengthened for truck/refer van movement
    - Packhouse development is essential to implement improved post-harvest technologies at major production hubs of fruits and vegetables across the country
    - Temporary storage facility (low temperature) for fresh commodities in extremely high demand among local traders
    - Local assembled markets need to be scaled up for selling the agri commodities in hygiene way
- Group 4: NGOs/civil society
    - Nature-based solutions
    - Innovations based on renewable energy
- Group 5: Donors
    - Multi-purpose cold storage
    - Accreditation institutes

Innovations to scale

- Examples (listed by us):
    - Axial blowers for onion storage
    - Solar dryers for mango and tomato
    - Mobile fish and vegetable vending with hygiene kits
    - Low-cost refrigerated tricycles for fresh produce
    - Aggregation hubs for women vendors
    - Packhouse models with cold storage for rural markets
- Group 1: Public sector
    - Low-cost and safe ripening chambers need to be scaled for the commercial ripening of fruits
    - Scale up facilities of value-added processed product groups in different areas of the (SMB) country
- Group 4: NGOs/civil society
    - Zero energy cool chambers (ZECC)
- Group 5: Donors
    - Solar dryers

4. Strengthening local food systems

Needs/challenges

- Group 3: Universities
    - Wastage of food
    - High production costs
- Group 4: NGOs/civil society
    - Storage for locally produced crops
    - Nutritional value of crops produced, farmers do not consider nutritional value when selecting which crops to grow

Wants

- Group 3: Universities

- Group 4: NGOs/civil society
    - Market linkages (producers to markets)
    - Adequate subsidies to stimulate uptake of innovation

Innovations to scale

- Examples (listed by us):
    - Floating gardens in flood-prone zones for vegetable production
    - Integrated rice–fish–duck systems operated by farmer cooperatives
    - Community aquaponics (tilapia + leafy greens) managed by youth
    - Urban rooftop gardening with hydroponics
    - Farmer-managed seed banks for local crops
    - Local food hubs linking producers to institutional buyers
- Group 1: Public sector
    - High-yielding variety innovations
    - Safe food production innovations
    - Short-cycle variety innovations
- Group 4: NGOs/civil society
    - Organic sack gardening
- Group 5: Donors
    - Introduce organic and conservation agriculture

5. Social protection innovations linked to food and nutrition

Needs/challenges

- Group 1: Public sector
    - Vulnerable group feeding
    - School meal program
    - Ideal diet for the pregnant period
    - Encouraging best feeding practices

Wants

- Group 1: Public sector
    - Identify the real vulnerable people/groups
    - Ensuring supply of safe, nutritious foods
    - Zn and Fe-enriched fortified food products
    - Ensuring adequate and sustainable funding for the vulnerable group funding program
    - Access to healthy foods at an affordable market price
    - Linkage development among the policy makers and stakeholders to execute the plans
- Group 3: Universities
    - Formation of common selling centers
    - Monitoring and follow-up of nutritional status

Innovations to scale

- Examples (listed by us):
    - School meal programs using zinc rice and eggs
    - Conditional food vouchers for pregnant women linked to antenatal care
    - Asset transfers of poultry and fingerlings linked to nutrition BCC
    - Community food banks with nutrition-sensitive targeting
    - Subsidized vegetable seed kits for low-income households
    - Cash-for-work programs integrating home gardening

6. Digital and data-driven solutions

Needs/challenges

- Group 1: Public sector

    - GIS and remote sensing-based crop monitoring and crop area estimation for better planning
- Group 3: Universities
    - Demarcate 30 agro-ecological zones through GIS, GPS, and remote sensing technology
- Group 4: NGOs/civil society
    - Weather and production information
    - Digital readiness of the locality
    - Farmers' access to digital platforms
- Group 6: CG centers
    - Farmers need an easy way to detect emerging diseases that they are aware of

Wants

- Group 1: Public sector
    - Automated groundwater monitoring
    - GIS-based surface water resource assessment
- Group 2: Private sector
    - Season-specific advisory services
    - Personalized weather forecasting
    - Improved localized IBF
    - Early digital signaling (warning on weather, pests, flooding)
- Group 4: NGOs/civil society
    - Low-cost technology
    - Digital soil mapping (organic matter and physical content)
- Group 6: CG centers
    - Instant diagnosis of the crop image analysis

Innovations to scale

- Examples (listed by us):
    - Geo-nutrition dashboards integrating soil and dietary data
    - Real-time dashboards tracking diet diversity and food prices
    - Near Real-Time Fisheries Analytics System
    - Mobile advisory apps for nutrition-sensitive farming
    - SMS-based dietary advice for pregnant women
    - QR code-enabled traceability for fish and vegetable markets
- Group 1: Public sector
    - IoT-based sensor-driven automated AWD for rice irrigation
- Group 2: Private sector
    - Climate advisory services
    - Crop diagnosis using an AI image through the APP
- Group 5: Donors
    - Policy optimization tool (PoLOPT) for resilience and decision
- Group 6: CG centers
    - Crop's field mapping and location-specific advice, e.g., fertilization, disease, and pest alerts

7. Climate-resilient food security innovations

Needs/challenges

- Group 1: Public sector
    - In Southern coastal areas: high salinity, dry season water scarcity, flash floods, cyclones
    - In the south: less vegetable production, widespread malnutrition, lack of irrigation water, fallow in the dry season
    - North Barind areas: drought in the dry season, lack of irrigation water, crop production problem in the dry season
    - Lack of drought and heat-tolerant varieties

    - Option for alternative income other than agriculture
    - Climate adaptive soil management in saline areas
    - Development hazards, exposures, vulnerability, and risk mapping
    - Water for irrigation in a hilly region
    - Energy for irrigation in hilly areas
- Group 3: Universities
    - Optimum utilization of land in coastal and hilly areas (agar plant, medicinal plants)
    - Salinity causes stunted growth, leaf burn, nutrient imbalance, and low yield
    - Lack of safe drinking water
    - High salinity level in soil hinders water uptake by the plant
    - Freshwater fish decline due to salinity
- Group 4: NGOs/civil society
    - Climate-resilient crop varieties
- Group 5: Donors
    - Climate resilient crop varieties and soil-water-agronomic management technologies
    - Verdict farming (AI drive)

Wants

- Group 1: Public sector
    - Salt, drought, and heat-tolerant varieties
    - Resilient production technologies
    - Efficient water use
    - Awareness among farmers
    - Low-emission rice production package
    - Development of low-carbon rice production
    - Carbon credits
    - Use of efficient irrigation technologies like AWD, sprinklers, and drip
    - Water conservation for irrigation in a hilly region
- Group 2: Private sector
    - Saline-tolerant and waterlogging-sensitive variant development
- Group 3: Universities
    - Climate-resilient house
    - Safe drinking water
    - Strong embankments
    - Salinity barriers
    - Enhance fresh water supply
    - Soil amendments with organic manure, biochar, etc.
- Group 4: NGOs/civil society
    - Biofortified variety development
- Group 5: Donors
    - Heat-tolerant crop varieties
    - Ozone-tolerant crop varieties
    - Photo-insensitive crop varieties
    - Resilient livestock and fish
    - Farmers need incentives to scale innovations

Innovations to scale

- Examples (listed by us):
    - Flood-tolerant rice varieties (BRRI dhan51, dhan52)
    - Solar-powered cold rooms for fruits, vegetables, and fish
    - Resilient fish seed systems (tilapia, carp) adapted to seasonal floods
    - Drought-tolerant maize for feed and food
    - Salinity Climate-resilient goat breeds for smallholder women -tolerant vegetable varieties
- Group 1: Public sector

    - Saline-tolerant variety development
    - Drought-tolerant variety development
    - Heat-tolerant variety development
    - Sub-mergence-tolerant variety development
    - Short-duration rice variety
    - Micro irrigation drip
    - Sprinkler and drain irrigation
    - Resilient production techniques
    - Carbon credit program
    - Development of historical and climate change scenario projections
    - High capacity solar-powered pump to lift water in hilly reason
    - Earthen/permanent small dam across the hilly stream
    - Organic farming
    - Optimum fertilizer management according to guideline
- Group 3: Universities
    - Salt-tolerant vegetable varieties
    - Salt-tolerant wheat for growing after Aman rice
    - Green manuring crop like Dhaincha production
    - Drip irrigation with salinity tolerant filter
    - Growing salt-loving plants like quinoa, barley

8. Market-based innovations

Needs/challenges

- Group 2: Private sector
    - Maintain commodity price (residue-free)
    - Safe food without agrochemical residues (within the Maximum Residue Limits)

Wants

- Group 2: Private sector
    - Traceability of agrochemical residue-free vegetables
    - Marketing of agrochemical residue-free vegetables
- Group 5: Donors
    - Public-Private Partnerships
    - Value addition (value chain in food systems)
    - Introducing risk insurance

Innovations to scale

- Examples (listed by us):
    - Women's Nutri-Hubs for biofortified crops and vegetables
    - Inclusive fish value chains serving the urban poor
    - Small-scale fortification enterprises for snacks and porridges
    - Franchise models for healthy street food vendors
    - Farmers' markets with nutrition labeling
    - Subscription-based vegetable and fish baskets for low-income households
- Group 2: Private sector
    - Better Life Center of Bayer for a safe food supply chain. The center provides information to farmers and traders about agrochemical residues and how to prevent them.
    - Maintain strong collaboration with the public and private sectors

9. Food safety and regulatory innovations

Needs/challenges

- Group 1: Public sector
    - Nutrition loss due to improper cooking systems

- Group 2: Private sector
    - Need for the introduction of biopesticides to farmers
- Group 3: Universities
    - Revision and updating of existing regulatory food policy
    - Strict implementation, monitoring, and evaluation of food policy
    - Lack of skilled and well-trained manpower to enforce the food policy
    - Post-harvest loss and poor storage infrastructure
    - Food production compliance

Wants

- Group 1: Public sector
    - Improve the cooking process of vegetables to preserve nutrients and vitamins
    - Low-cost testing kits for Maximum Residue Levels (MRL) determination are needed at the local market level
- Group 2: Private sector
    - Ensure availability of biopesticides
- Group 3: Universities
    - Affordable, available, and accessible safe food
    - Biorational approach
    - Storage infrastructure established by the government, NGOs, and the private sector
    - Phytosanitary and quarantine measures

Innovations to scale

- Examples (listed by us):
    - Improved post-harvest fish handling protocols (ice, hygiene)
    - Hygiene grading schemes for informal food markets
    - Biological control of aflatoxins in maize and groundnut
    - Low-cost water testing kits for market vendors
    - Mobile-based food safety reporting system
    - HACCP-compliant packaging for small-scale processors
- Group 1: Public sector
    - Reduce pesticide MRL using salt solution (2%) at the household level to ensure food safety (fruits and vegetables)
    - Low-cost soil testing kit
- Group 2: Private sector
    - Biopesticide-based Integrated Pest Management (IPM) package development
- Group 5: Donors
    - Good Agricultural Practices (GAP)
    - Traceability of crops

10. Health system delivery innovations

Needs/challenges

- Group 3: Universities
    - Risk of contamination by microbial pollutants, etc.
- Group 4: NGOs/civil society
    - Awareness of nutritional food (safe)
    - Availability of nutritional food (diversified)

Wants

- Group 3: Universities
    - Temperature and humidity-controlled food vans
- Group 4: NGOs/civil society
    - Advisory services on nutrition, food, and a healthy diet

Innovations to scale

- Examples (listed by us):
    - Mobile tools for infant and young child feeding (IYCF) counseling
    - Nutrition education modules in health centers with fish-based dietary guidance
    - Integrated nutrition counseling within antenatal/postnatal care
    - Growth monitoring linked to agricultural interventions
    - Nutrition-sensitive community health worker programs
    - Micronutrient supplementation linked to diet counseling
- Group 3: Universities
    - One health policy
- Group 4: NGOs/civil society
    - School lunch programs (nutritional and organic)

11. Locally led or Indigenous innovations

Needs/challenges

- Group 2: Private sector
    - Over-reliance on commercial seeds
- Group 3: Universities
    - Low production
    - Not familiar with others
    - Not available
    - Not competitive with existing options
- Group 4: NGOs/civil society
    - Identify locally led indigenous innovations

Wants

- Group 2: Private sector
    - Access to locally preserved seeds
- Group 4: NGOs/civil society
    - Establish local seed banks

Innovations to scale

- Examples (listed by us):
    - Promotion of small indigenous fish species (e.g., mola) for child nutrition
    - Women's groups preserving traditional leafy vegetable use (pui shak, kolmi shak)
    - Farmer-led seed networks for zinc rice
    - Indigenous food festivals promoting healthy traditional diets
    - Local grain milling cooperatives for fortified flour
    - Traditional fermentation techniques for enhanced nutrient absorption
- Group 2: Private sector
    - Farmer-led seed network for the seed bank
- Group 5: Donors
    - Community gene and food bank
- Group 6: CG centers
    - Market linkage collection point for the premium fair of the farmers' produce

Annex 2. Results of Innovation Scaling Exercise

Innovation: Biopesticide-based Integrated Pest Management (IPM) practices

Under Food safety and regulatory innovations

Barriers

- Lack of proper knowledge on biopesticides among growers
- Lack of availability of biopesticides
- Limited affordability of biopesticides
- Counterfeit formulations
- Slow action of biopesticides (it takes time before it shows results)
- Needs skilled manpower to apply biopesticides
- Not suitable for all purposes

Opportunities/drivers

- Food safety
- High valued
- Eco-friendly and sustainable
- Export opportunities
- Business prospects
- Health hazard-free
- Low cost
- Prevent pest resurgence and outbreaks
- Save unnecessary and injudicious application of chemical pesticides
- Less dependency on imported chemical pesticides

Strategy (how)

- Policy formulation
- Easy registration process
- Subsidization
- Awareness creation among growers and policymakers
- Effective last-mile supply chain
- Academia-industry collaboration for continuous improvement
- Capacity building on the application of biopesticides
- Field demonstrations on the application of biopesticides

Innovation: Low-cost and safe fruit ripening technology

Under Food safety and regulatory innovations

Barriers

- Lack of infrastructure
- Lack of knowledge on food safety
- Lack of financial support to disseminate the technology
- Lack of willingness of the small trader to adopt the technology

Opportunities/drivers

- Availability of low-cost and safe food ripening technology
- Food safety regulations
- Existing GAP protocol

Strategy (how)

- Invest in capacity and infrastructure
- Demonstrate the technology in the field

- Campaign through TV, social media, etc.
- Monitoring and feedback

Innovation: Climate-resilient crop varieties

Under Climate-resilient food security innovations

Barriers
- Capacity
- Infrastructure
- Awareness
- Input constraint
- Market linkages

Opportunities/drivers
- Conversion of fallow land under cultivation
- Livelihood improvement
- Ensure food security and climate vulnerability

Strategy (how)
- Strengthen public-private partnership
- Provide climate risk insurance funds
- Adaptation and mitigation measures
- Seek funds from GEF. GCF, CCTE, Global Shield, etc.

Innovation: Precision agriculture, livestock and fisheries, internet based agric farm automation (agriculture, livestock and fisheries)

Under Climate-resilient food security innovations.

Barriers
- Lack of skilled manpower
- Limited investment
- Limited motivation of farmers
- Limited availability of equipment
- Weak internet connectivity

Opportunities/drivers
- Climate-smart
- Ensure food security
- Crop intensification
- Easy scale-up
- Available technology (e.g., IoT device and sensor)
- Boost agricultural production
- Risk reduction
- Availability of climate data for future forecasting based on farmers' operated IoT device store in the cloud, creating precision agriculture

Strategy (how)
- Internet-based agric-farm automation
- Smart irrigation
- Smart greenhouse
- Smart poultry house
- Smart fish farming
- Smart cattle ranching

Innovation: Water testing kit for farmers

Under Food safety and regulatory innovations

Barriers

- Water testing kits are available but expensive, one-time cost
- Spare parts are difficult to find in the local bazaar/market
- If anything goes wrong, skilled technicians are not always available

Opportunities/drivers

- The government has other subsidies
- Water testing is an equally important aspect to explore the subsidy
- Import tax on these kits can continue to be assessed
- There is technical manpower/resource/skill at engineering universities and agric companies
- What's lacking includes finance, private partner technology
- Lack of awareness among farmers and government agencies

Strategy (how)

- DAE and DOF need to be engaged through MOV
- Water testing kits can be given to the Upurila agriculture GAO, fisherman extension office for pilot, livestock extension office should be engaged
- CGIAR should engage with the government to develop policy or guidelines
- Initiate development of a prototype in Bangladesh through a partnership between the donor (funding), universities (research), private sector (monitoring and scaling)

Innovation: Golden rice (provitamin A)

Under Nutrition-sensitive agricultural innovations

Barriers

- Environmental clearance
- Consumer acceptability
- Deteriorating vitamin A value over storage time

Opportunities/drivers

- Vitamin A source
- High yielding
- Same management procedures as other rice varieties
- Average market price (not higher than other rice varieties)
- Taste does not different than other rice varieties

Strategy (how)

- Government initiative to get an environmental certificate
- Encourage innovative farmers to grow golden rice through capacity building
- Increase the supply of seed and availability
- Provide financial support or micro-credit to the "innovative" farmers
- Media coverage to motivate the public perception

Innovation: Efficient irrigation technology (AWD)

Under Climate-resilient food security innovations

Barriers

- Lack of farmers' awareness
- Water pricing system

- Lack of knowledge of extension personnel
- Poor scale-up modality
- Not yet considered as money for farmer technology
- Lack of proper government strategy and policies

Opportunities/drivers

- Huge rice-producing and irrigated area
- Not yet explored for caron credit
- No need for a drainage canal for drying up
- Partner and others

Strategy (how)

- Strategy for promotion and adoption of AWD
- Development of adoption modality – group/community-based
- Make this technology as money for farmers
- Technology package for scale-up
- Introduction of carbon credit program

Innovation: Zero Energy Cool Chamber (ZECC)

Under Food distribution and supply chain innovations

Barriers

- Short-term storage
- Temperature control
- Large-scale product storage

Opportunities/drivers

- Increase farmers' bargaining power
- Extend shelf-life for a certain period
- Small-scale households
- Local market/bazar
- No energy required (water-moisture based)
- No carbon emission and environmentally friendly
- Increase farm productivity and profitability
- Low-cost, affordable
- Easy technology
- Effective for adverse weather conditions
- Reduce food loss and contribute to food security

Strategy (how)

- Community-based
- Link with microfinance institutions
- Farmers/producers capacity building
- Promotion of technology by workshops, training modules, and mass media
- Department of Agriculture Extension to include at agric development programs (NGOs and others)
- Government subsidy/incentives
- Further innovation, results for commercialization, including the private sector and research institutes

Appendix 1. List of Participating Institutions

Institution	Category of Stakeholder
Bayer CropScience Ltd	Private sector
BRAC	NGO / CSO
Mukti Foundation	NGO / CSO
Bangladesh Sugarcrop Research Institute	Public sector
FAO	International Research and Development
Rural Development Academy (RDA)	Public sector
Aunkur AI	Private sector
Abedin Equipment Limited	Private sector
Bangladesh Agriculture Research Institute	Public sector
Ispahani Agro Limited	Private sector
LoGIC, UNDP	International Research and Development
Bangladesh Livestock Research Institute	Public sector
Soil Resource Development Institute	Public sector
Bangladesh Rice Research Institute	Public sector
Khulna Agricultural University	Academia / Research
Bangladesh Rural Development Board	Public sector
Bangladesh Fertilizer Association (BFA)	Farmer organization/association/group
Sher-e-Bangla Agricultural University	Academia / Research
Bangladesh Agricultural Research Council	Public sector
Department of Agriculture Extension (DAE)	Public sector
Bangladesh Rice Research Institute	Public sector
BOPINC	NGO / CSO
BFRI	Academia / Research
Seed Certification Agency	Public sector
Bangladesh Agricultural Research Institute (BARI)	Public sector

Grameen Jano Unnayan Sangstha	NGO / CSO
Lal Teer Seed Ltd	Private sector
ACDIVOCA	NGO / CSO
SAARC Agriculture Center	International Research and Development
International Rice Research Institute	International Research and Development
Sushilan	NGO / CSO
HSTU Dinajpur	Academia / Research
Gazipur Agriculture University	Academia / Research
FIVDB	Private sector
DAE Horticulture	Public sector
Bangladesh Agriculture Development Corporation	Public sector
FAO	International Research and Development
SAARC Agriculture Center	International Research and Development
RIMES	International Research and Development
Department of Fisheries	Public sector
Bangladesh Institute of Research and Training on Applied Nutrition	Academia / Research

Appendix 2. Posters on Innovation Categories

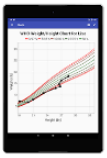
Innovation categories

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: *Low-cost water testing kits* for market vendors.



Health system delivery innovations

- New models, tools, or processes that strengthen how health services provide nutrition care, counseling, or interventions.
- Example: *Mobile tools* for infant and young child feeding (IYCF) counseling.

Locally led or Indigenous innovations

- Solutions created, adapted, or governed by local or indigenous communities based on their knowledge, practices, and priorities.
- Example: Women's groups preserving *traditional leafy vegetable use* (pui shak, kolmi shak).

Innovation categories

Strengthening local food systems

- Interventions that enhance the resilience, coordination, and sustainability of locally rooted production, processing, and marketing systems.
- Example: *Floating gardens in flood-prone zones* for vegetable production.

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: *Community food banks* with nutrition-sensitive targeting.

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: *SMS-based dietary advice* for pregnant women.

Innovation categories

Nutrition-sensitive agricultural innovations

- Agricultural practices or technologies designed to improve food production while directly enhancing dietary diversity and nutritional outcomes.
- Example: *Zinc-biofortified rice* or *Golden Rice (pro-vitamin A)* that increases mineral or vitamin 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: *Village nutrition champions (peer educators)* that use demonstrations, stories, peer support, and nudges to encourage healthier diets.

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: *Low-cost refrigerated tricycles for fresh produce* and *packhouse models with cold storage for rural markets* 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: *Climate-resilient goat breeds* for smallholder women.

Appendix 3. Media Coverage

daily sun
TRUE AND IMPARTIAL

Print: 20 Jan 2026

Bangladesh

Workshop on 'Research and Innovation Scaling Demand in Bangladesh' held in Dhaka

CIMMYT and IWMI co-host the event

Daily Sun Report, Dhaka
Published: 12 Dec 2025, 06:04 AM

Photo: Courtesy

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https://www.daily-sun.com/bangladesh/845568/workshop-on-research-and-innovation-scaling-demand-in-bangladesh-held-in-dhaka 1/4

20/01/2026, 15:07 CIMMYT, IWMI workshop focuses boosting CGIAR innovation, scaling in Bangladesh

Tuesday, January 20, 2026

DhakaTribune
12 YEARS OF TRUTH, TRUST & TRANSFORMATION

Print Now

Tuesday, January 20, 2026

E-paper

CIMMYT, IWMI workshop focuses boosting CGIAR innovation, scaling in Bangladesh

Representatives from government institutions, research organizations, development partners, the private sector, farmer groups, and civil society attended the workshop

Photo: Courtesy

Press Release

Publish : 11 Dec 2025, 07:33 PM | Update : 11 Dec 2025, 07:44 PM

The International Maize and Wheat Improvement Center (CIMMYT) and the International Water Management Institute (IWMI) jointly hosted a stakeholder engagement workshop titled "Research and Innovation Scaling Demand in Bangladesh" on Thursday in Dhaka, m[illegible]g a significant step toward strengthening demand-driven agrifood innovation in the coun[illegible].

The event brought together representatives from government institutions, research organizations, development partners, the private sector, farmer groups, and civil society.

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CGIAR SCALING FOR IMPACT

IWMI International Wate Management Instit