Digital Advisory Services for Agriculture
Innovation Package

This document outlines the rationale and design of AIM for Scale's Digital Advisory Services for Agriculture Innovation Package and the details of this package. AIM for Scale is dedicated to scaling cost-effective innovations to improve the livelihoods of farmers, particularly small-scale producers, in low- and middle-income countries. Despite strong evidence that digital advisories, such as weather forecasts and input recommendations, can improve farmer decisions and outcomes, most services have not reached scale. However, viable pathways to scale exist, presenting a compelling case for investing in digital advisory services for agriculture. This Innovation Package aims to deliver digital advisory services to more than 100 million farmers by 2028.

The Digital Advisory Services for Agriculture Innovation Package was co-designed by a Technical Panel comprising experts from the University of Texas at Austin, Cornell University, Penn State University, University College London, the International Center for Tropical Agriculture (CIAT), the Asian Development Bank (ADB), the Inter-American Development Bank (IDB), the World Bank, the Gates Foundation, and the UK's Foreign, Commonwealth & Development Office (FCDO). The Package builds on the work of the Innovation Commission for Climate Change, Food Security, and Agriculture and the Development Innovation Lab at the University of Chicago. Responsibility for finalizing the design of the package and shepherding it to overcome barriers to scale rests with AIM for Scale.

Delivering Digital Advisory Services to Farmers at Scale in Low- and Middle Income Countries

Digitally delivered advisory services can provide farmers with timely, customized, and actionable information. Evidence shows that information such as weather forecasts, pest advisories, and recommended inputs, even when delivered via basic text or voice messages, can be a cost-effective way to support better decision-making and increase yields or incomes. For instance, SMS-based weather forecasts improved planting decisions in Ghana and Pakistan, led to better land use and input choices in India, and yielded US$104–US$356 per farmer annually in Benin at a delivery cost of under US$0.10 over five years. Pest advisories helped improve agricultural practices and/or yields in Kenya, India, Ecuador, and Bangladesh. Text-messages with soil information resulted in increased use of recommended inputs, with a marginal benefit-cost ratio estimated at 46:1. In a number of contexts, benefits of transmitting information likely exceed costs by an order of magnitude. Digital tools have also made it easier for farmers to access high-quality inputs, find trustworthy services, get help from extension agents, and connect sellers and buyers, supporting more stable markets.

Despite their potential, many digital advisory services have struggled to reach scale–though exceptions exist. As with broader agricultural advisory systems, digital agricultural advisory services are unlikely to scale under fully private models that require farmers to pay, since the information they provide has public good characteristics: it is non-rival and difficult to exclude once shared. This limits the incentives of private providers to invest in broad outreach or sustained delivery, particularly in low-income or remote areas. Moreover, once a system is set up and the marginal cost of reaching additional farmers is close to zero, excluding those who are unable to pay is inefficient: it means that valuable information goes unused, even though sharing it would cost almost nothing.

The Package responds to four premises. First, access to accurate agricultural information and the ability to act on it are essential for farmers. Second, the quality of information is vital, and it can be improved through significant local input and advanced techniques, such as artificial intelligence (AI). Third, the delivery method and messaging of information significantly affects how farmers respond to it. Fourth, while successful examples of digital advisory services exist, there is substantial fragmentation and a need to consolidate efforts, reach new farmers, and improve the quality of information delivered.

In undertaking these efforts, a particular focus is on ensuring a range of small-scale producers–including those who have historically been underserved or are in marginalized or hard-to-reach contexts–with productive potential are reached with digital advisory services. Further, in focusing on digital advisory services as an entry point, AIM for Scale recognizes that farmers often face multiple, interconnected constraints—and that complementary investments in areas like finance, inputs, and infrastructure may be necessary to enhance the returns to digital services. Rather than attempting to bundle all interventions upfront, AIM for Scale prioritizes scalable innovation entry points while remaining responsive to the need for complementary investments as part of broader national efforts. AIM for Scale offers a platform to help realize these opportunities by serving as an independent broker and convener, coordinating efforts across the public sector, private sector, and development partners, facilitating collaboration among countries and donors, supporting project implementers with expert guidance, and identifying and employing global resources for local impact.

Innovation Package Components

This Innovation Package proposes investments across five interconnected and complementary components:

1. **Systems and channels of farmer reach** establish how farmers, particularly small-scale producers, are identified and reached as well as the best channel of delivery. These must align with other components to ensure effective service delivery.

2. **Digital infrastructure, tools, and platforms** ensure the availability of a digital architecture and hosting systems that enable the processing and delivery of quality agricultural information and services.

3. **Content** defines how agricultural information and data will be generated, integrated, and translated into actionable information and services that farmers can use.

4. **Behaviorally informed, farmer-centered services** shape whether farmers understand, trust, and use the information provided. They also influence how well lessons from existing evidence are incorporated into system rollout, highlighting the need for user-centered design and local adaptation as programs scale.

5. **Sustainability and innovation** ensure long-term viability through stakeholder coordination and the generation of rigorous evidence on the cost-effectiveness of emerging innovations and approaches.

These components should not be treated as sequential steps, but rather as interacting and complementary investments.

1. Systems and Channels of Farmer Reach

Goal: Align investments to establish or strengthen foundational systems and delivery channels to reach farmers at scale. This component focuses on the systems, partnerships, and communication channels needed for scalable delivery, recognizing that impact at scale is only possible if people can be reached, including those who have historically been underserved or are in marginalized or hard-to-reach contexts, and that the right channels must be chosen to do so. It also involves navigating regulatory constraints, safeguarding data privacy, and promoting equitable access.

Activity 1: Conduct or leverage existing country-level assessments to identify and implement pathways for governments to reach farmers at scale. This includes identifying channels of delivery across farmer segments and maximizing reach as well as considering the access barriers faced by more vulnerable groups.

- Identify and assess existing farmer registries and databases (e.g., social protection, input subsidies, and land records) for their potential to be repurposed, merged, or expanded.

- Consider the context-specific relevance of multi–channel options for outreach (e.g., SMS, Interactive Voice Response [IVR], community radio, and local call-centres), with a focus on inclusivity to address gender, literacy, and smartphone access gaps.

- Define clear use cases based on farmers' informational needs and value chain priorities.

- Assess opportunities for private sector and civil society partners, including telecommunication providers and agribusinesses, to support delivery.

Activity 2: Invest in closing critical gaps in farmer reach capabilities and channels of delivery identified through the assessment to enable digital advisory service scale-up. Align needs with relevant elements of digital public infrastructure, such as national ID systems and social protection databases, as well as other related priorities where applicable (e.g., export market regulatory compliance for deforestation, phytosanitary control or emergency warning systems) to help ensure relevance and long-term sustainability.

Target outputs:

- At least 10 countries establishing, expanding, or improving foundational systems and delivery channels to reach farmers at scale by 2028, including building, expanding, merging and/or repurposing farmer registries and related identification databases, as needed.
- Assessment of current state of public and private digital advisory services in each target country within one year of country selection.

2. Digital Infrastructure, Tools, and Platforms

Goal: Strengthen the digital architecture that enables advisory services by deploying or enhancing publicly supported tools and platforms. This includes investing in modular, interoperable, and scalable Digital Public Infrastructure (DPI) across components of this Innovation Package that is suited to local contexts and designed to support automation, integration, and adaptability across languages, devices, and connectivity levels. Achieving impact at scale requires robust systems that enable efficient service delivery, seamless integration, and reliable data flow.

Activity 1: Work with governments and other partners to conduct country-level assessments to identify DPI minimum viable product use cases and develop investment cases as appropriate.

- Take stock of, assess and explore opportunities to integrate across existing digital tools (databases, apps) and strategies.
- Identify and prioritize use cases, building on existing institutional arrangements and methodologies where available (e.g., Digital Roadmap Playbook).
- Conduct return on investment and cost-benefit analyses to determine core elements of DPI, and when to adopt, adapt, refine, or develop new tools based on context and need.

Activity 2: Invest in digital tools for advisory service provision to farmers based on priority use case assessment.

- Design platform requirements and ensure alignment with existing DPI and data-sharing standards, including meeting countries' data sovereignty requirements.
- Define institutional data-sharing protocols and content licensing frameworks to enable secure reuse, interoperability, and integration across systems and platforms.

Activity 3: Explore country interest in adopting "building blocks" to assemble the operating system and basic functions of DPI for advisory services. These could include components such as farmer registries, data exchange layers, and advisory delivery engines. This approach enables governments to build adaptable systems without starting from scratch.

- Assess country demand and assemble a demand-based initial country cohort.
- Broker technical assistance and training, and support knowledge exchange through learning trips.
- Broker the development of reliable, interoperable DPI building blocks and related toolkits. Facilitate funding for host entities and developers.

Target outputs:

- At least 10 countries developing or enhancing DPI for agriculture by 2028 with a mapping of existing public and private digital advisory services in each country where not already available.
- By 2028, establish partnerships to develop software “building blocks” for DPI, if there is sufficient country demand.

3. Content

Goal: Enhance the quality, availability, and integration of essential agricultural information and data inputs (e.g., weather, soil, pests, and prices) and strengthen the systems that translate these into validated, timely, localized, and actionable recommendations for smallholder farmers.

Activity 1: Identify and prioritize opportunities to consolidate and share national and regional content on agricultural recommendations and datasets, in order to make relevant guidance more accessible and usable for agricultural value chain actors.

- Assess the availability and quality of agriculturally-relevant advisory content and datasets from government and other institutions.
- Identify opportunities to digitize, consolidate, and make content and data available.
- Explore opportunities to translate validated agronomic datasets–such as area-level soil test results or region-specific management practices–into actionable recommendations that can be digitally disseminated.
- Explore opportunities to combine static recommendations (e.g., soil chemistry, management practices) with dynamic advice (e.g., weather forecasts).
- Build knowledge on available datasets for different locations and share with governments to underpin potential advisory services.
- Leverage regional and global expertise where appropriate to complement local technical capabilities in identifying and validating data sources and emerging technologies.

Activity 2: Tailor, validate, and benchmark content as appropriate to ensure accuracy and farmer-relevance.

- Establish systems, using remote sensing and/or local validation and ground-truth data, for assessing and validating content and recommendations, including incorporating data to improve the timeliness and relevance of other content as well as establishing data quality protocols.
- Accelerate the validation and integration of new models, including "back-end" AI tools, which may support more targeted recommendations by enabling customization and delivery of information in multiple languages and formats.

Target outputs:

- At least 10 countries setting up systems to consolidate and validate the accuracy and relevance of advisories with the goal of making them more usable and relevant for farmers (e.g., weather and soil chemistry data) by 2028.
- Up to five countries exploring AI tools to generate targeted recommendations (e.g., combining static and dynamic information) for farmers by 2028.

4. Behaviorally-Informed, Farmer-Centered Services

Goal: Embed “learning-by-doing” approaches into delivery systems to ensure information is understandable, trustworthy, and actionable for farmers. This involves articulating theories of change to understand why interventions work and whether they are inclusive, adapting global evidence to local contexts, aligning content with farmers’ needs and decision-making environments, applying behavioral science and design principles into program delivery, and building mechanisms for sustained engagement over time.

Activity 1: Support countries in adopting “learning-by-doing” models. Strategies such as continuous experimentation, blended delivery models, combining digital channels with human interaction, integrating social networks, bundling services, and deploying nudges can promote relevance and sustained engagement.

- Provide hands-on support to government agencies and implementing partners to design and execute rapid testing protocols and learning cycles addressing user needs, such as A/B tests, feedback loops, and iterative, adaptive product design.
- Develop validation systems for extension agents, and farmers to test and provide structured feedback and ratings on advisory content.
- Compile and synthesize insights from testing and implementation efforts into accessible learning products to inform broader uptake.

Activity 2: Establish systems and supporting tools to enable iterative service improvements by identifying friction points in the user journey.

- Support implementing partners in establishing structured feedback loops, such as surveys, interviews, and helpdesk logs, to maintain content relevance, credibility, and usability.

Target outcomes:

- At least three countries setting up project management units to design and execute rapid testing protocols, and build local capacity by 2026.

- At least 10 countries implementing learning-by-doing models to optimize the design and delivery of user-centered advisory services by 2028. This may involve investing in transitional support structures, such as program implementation units to manage early-stage development and delivery, and building government capacity.

5. Sustainability and Innovation

Goal: Ensure that digital advisory services are grounded in institutions and systems that can adapt, evolve, and sustain impact over time. This includes strengthening mechanisms to generate evidence on social and technical innovations aimed at improving effectiveness. Additionally, this covers sharing that evidence, for instance, through partnerships, and by creating a global community of practice to manage knowledge across countries over time. As part of this effort, explore the potential of emerging technologies such as AI, not as stand-alone solutions, but as tools that may, over time, greatly increase the ability to tailor messages to context, and lower the cost and complexity of sustaining high-quality advisory services at scale.

Activity 1: Explore the potential of institutional systems or partnership models to enhance public sector capacity to enable sustained service provision.

- Assess the sustainability and effectiveness of build-operate-transfer (BOT) approaches, on-demand technical assistance, tech-savvy recruitment programs, bundling public and privately produced services, and other innovative models.

Activity 2: Establish mechanisms to support the effective replication and scale-up of successful advisory service models.

- Set up a community of practice with government partners, implementing agencies, and multilateral development banks (MDBs) to enable real-time exchange of implementation experiences, and promote convergence around technical standards and delivery models.

- Expand the knowledge base through activities such as brokering technical partnerships, developing training programs, organizing site visits and virtual exchanges, hosting an online community of practice, and disseminating lessons across countries.

Activity 3: Generate robust evidence on how and when digital advisory and weather services can work at scale, with a focus on key questions related to scalability and the role of emerging technologies such as AI.

- Consolidate and synthesize lessons on the design of effective and scalable advisory systems, with a focus on services that can operate at scale.
- Explore the potential of Large Language Models (LLMs) across the advisory service value chain, particularly for understanding how farmers interact with LLMs and other AI-powered content, as well as the potential for bias in the underlying LLM data.
- Identify evidence gaps and drive collaborative efforts to close them, source new research proposals and facilitate matchmaking with funders, and promote the broader dissemination of key ideas and lessons.
- Generate and disseminate evidence leveraging existing but underutilized approaches–e.g., crowdsourcing and validating farmer data to improve advisory recommendations and generate useful information for broader use; using remote sensing to enable lower-cost measurement at scale; assessing the value of tailored information delivery models that adapt to both environmental conditions and farmer-specific characteristics (e.g., literacy, experience, learning preferences) to enhance uptake and sustained use.

Target outputs:

- By 2026, a community of practice with government partners, implementing agencies, and MDBs established to enable real-time exchange of experiences, and promote convergence around technical standards and delivery models.
- White paper completed by 2026 that draws on rigorous evidence to identify underlying theories of change and explores how scalable design features interact with behavioral mechanisms such as attention, comprehension, trust, and follow-through.
- By 2028 at least three impact evaluations to expand the knowledge base on digital advisory services and, if appropriate, the potential for AI to enhance advisory services.