



**CGIAR
DIGITAL
TRANSFORMATION**

REPORT

CGIAR Digital Transformation Accelerator strategy dialogue

CGIAR Science Week 2025

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Executive summary

On 10 April 2025, during CGIAR Science Week at the United Nations Office in Nairobi, CGIAR convened over 300 stakeholders for the Digital Transformation Accelerator (DTA) strategy dialogue. This high-level event marked a significant milestone in CGIAR's journey to become a leader in inclusive, data-driven transformation of food, land, and water systems.

The dialogue introduced the vision, strategy, and flagship initiatives of DTA, an ambitious new CGIAR accelerator focused on harnessing digital innovation, artificial intelligence (AI), and big data to address global challenges in agriculture and sustainability, particularly in the global South.

Context and goals

With climate change and underdeveloped digital ecosystems pose major challenges, especially for smallholder farmers, CGIAR is investing in digital transformation to enhance decision-making, improve research impact, and promote inclusive innovation. DTA aims to:

- Align CGIAR's digital efforts through interoperable, scalable systems.
- Leverage AI, machine learning, and real-time analytics.
- Build collaborative infrastructure with partners across sectors.
- Support locally relevant, sustainable agricultural development.

Strategic vision and pillars

Sandra Milach, chief scientist, CGIAR set the tone with a call to build a 'digital feedback infrastructure', a modular, interoperable backbone that connects CGIAR's data systems - enabling tools like digital twins, predictive modeling, and seamless data sharing.

Ram Dhulipala, DTA director, presented DTA's strategy, structured around four areas of work:

1. Enabling Environment - partnerships, business models, infrastructure.
2. Digital Futures - Foresight and frontier technology alignment.
3. Action Labs - Co-creation and testing of inclusive, human-centered tools.
4. Data Innovations - System-wide implementation of FAIR, AI-ready data.

Flagship initiatives

Five high-impact products and platforms were introduced:

- The Data Collaborative: A governance mechanism for system-wide alignment on data sharing, interoperability, and FAIR principles.
- Federated Data Systems: Secure, distributed data access and analysis across CGIAR centers.
- Agricultural Large Language Models (AgriLLMs): Custom AI models trained on agricultural data from Global South.
- Digital Twins: Real-time simulations of farming and environmental systems for predictive insights.
- AI Hub: A global platform linking CGIAR with AI expertise to co-develop context-sensitive, scalable innovations.

Dialogue and panels

Panel 1: Agricultural advisories and digital public infrastructure

Panelists from OpenAgriNet, Kuza, Digital Green, and the Kenya Agricultural and Livestock Research Organization (KALRO) emphasized the need for:

- Local co-design, dynamic data streams, and human-centered extension models.
- Digital Public Infrastructure (DPI) to support equitable access to advisories.
- CGIAR's role in making data actionable, accessible, and embedded in farmer-facing systems.

Panel 2: Emerging donor and implementor landscape around digital transformation of food, land and water systems

Global leaders from the World Bank, the United Arab Emirates (UAE) government, and the German Agency for International Cooperation (GIZ) shared priorities for DTA:

- Solve data fragmentation and connect existing innovations.
- Focus on scalable, transformative solutions, not pilots.
- Leverage CGIAR's strength in open data and technical depth.
- Build global AI and digital public goods through international collaboration.

Closing message

Micheline Ayoub, CGIAR's chief of staff, closed the event by reaffirming that CGIAR's digital transformation is about partnership, inclusion, and shared action – not just tools or platforms. Success hinges on collaboration across sectors and geographies, with equity and sustainability at its core.

The strategy dialogue concluded with a unified call to continue building a future where digital innovation accelerates sustainable impact for smallholder farmers and vulnerable communities worldwide.

1 Introduction

The world faces interconnected challenges like climate change and shifting consumption patterns, with the Global South struggling with sparse data that limits the local adaptation of digital technologies to address them. At the same time, vulnerable populations need tailored, inclusive solutions to address poverty and inequality.

CGIAR Digital Transformation Accelerator (DTA) in the CGIAR 2025–2030 portfolio focuses on co-creating inclusive solutions by leveraging advancements in AI, machine learning, modelling, and big data analytics. The goal is to drive improved decision-making, policies, and investments, and to promote the broader adoption of digital tools for sustainable food, land, and water systems transformation.

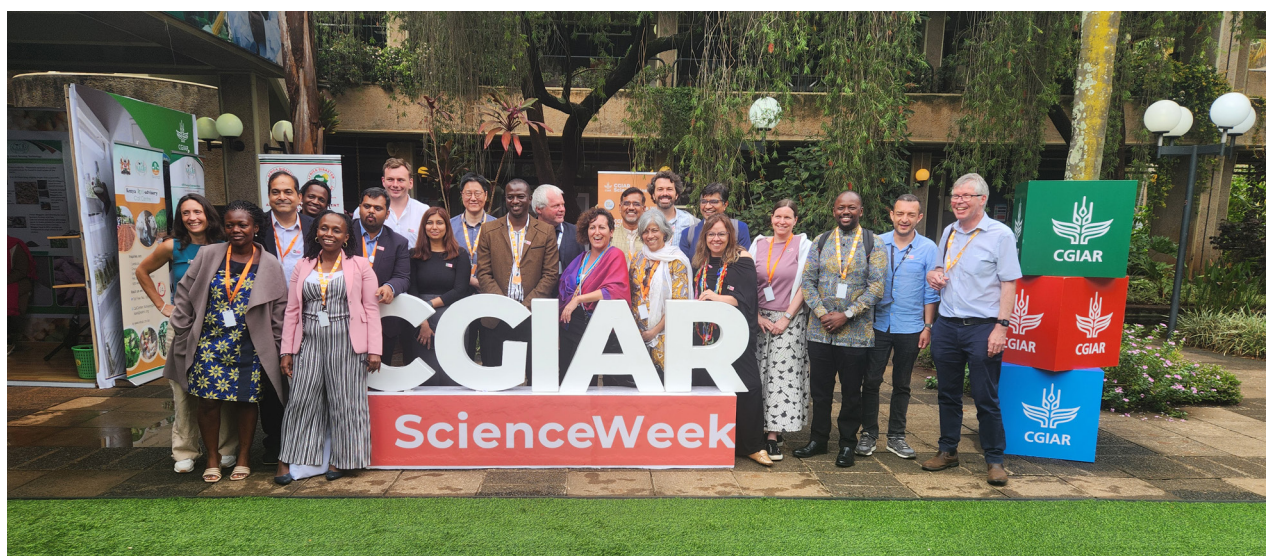
On 10 April 2025, at the United Nations Office in Nairobi, DTA held a strategy dialogue that brought together global stakeholders to advance a unified vision for digital transformation across CGIAR and its partners. The event explored how this new CGIAR accelerator will use AI, data analytics, and digital tools to create inclusive solutions for transforming food, land, and water systems, aiming to be a leader in data-driven research and decision-making.

1.1 Objectives of the event

The three-day DTA inception workshop was facilitated by Lina Yassin, director, digital and data product. The aim of the event was to inform, engage, and mobilize stakeholders to support CGIAR DTA's efforts to create impactful, data-driven solutions for a sustainable future. Specifically, the objectives were to:

1. Introduce and explain CGIAR Digital Transformation Accelerator's goals, strategies, and planned activities to stakeholders.
2. Showcase how AI, data analytics, and digital tools will be used to address challenges in food, land, and water systems.
3. Gather feedback from partners and stakeholders on the accelerator's implementation plans.
4. Facilitate the exchange of best practices and lessons learned in the use of digital technologies for sustainable development.
5. Potentially attract funding and resources for the accelerator's activities.

The event, which was held during the CGIAR Science Week 2025, attracted over 250 in-person and over 50 online participants. It was officially opened by Sandra Milach, chief scientist, CGIAR.



Speakers, panelists, and moderators of the DTA strategy dialogue. Photo credit: ILRI/Wandera Ojanji.

2 Setting the stage: Jawoo Koo, deputy director, DTA

Jawoo Koo set the stage for discussions by engaging the audience with a brief narrative behind a graphic highlighting a major milestone in global data science: Approximately two decades ago, NASA released the Shuttle Radar Topography Mission (SRTM) dataset—one of the first publicly available global digital elevation datasets, derived from space shuttle missions. While this dataset marked a significant advancement, it included critical gaps and inaccuracies in certain geographies, limiting its utility for comprehensive global analysis.

Recognizing these deficiencies, CGIAR scientists mobilized to enhance the dataset. They filled in missing data and corrected topographical inaccuracies, resulting in the creation of the CGIAR-CSI SRTM Version 4 dataset. First released in 2004, this enhanced dataset quickly became one of the most widely used resources in the geospatial community. Koo emphasized that the CGIAR-CSI SRTM Version 4 continues to underpin many modern digital applications—including some foundational elements in widely used platforms such as mobile weather apps. He highlighted this as a powerful example of CGIAR's capacity to generate global public goods - digital tools and datasets that extend far beyond agricultural research, influencing a broad spectrum of global digital and scientific ecosystems.

This anecdote underscored the central theme of the dialogue: the pivotal role of CGIAR's digital transformation efforts in supporting not only its internal research agenda but also the broader global digital infrastructure.

3 Opening remarks by Sandra Milach, chief scientist, CGIAR Building a minimum viable product (MVP) to scale



Sandra Milach opened the DTA strategic dialogue with reflections on the breadth and excitement of the scientific sessions taking place throughout CGIAR Science Week. She noted the richness of research being showcased across various programs and parallel side events, emphasizing a unifying theme that consistently emerged across the portfolio: evidence-based, data-driven science.

Data, she stressed, is at the core of how CGIAR delivers science—whether in generating knowledge or in guiding decision-making. In Milach’s words, data is perhaps CGIAR’s most valuable asset, and stewardship of this resource requires coordinated vision and action.

Sandra Milach, chief scientist, CGIAR, delivering her opening remarks. Photo credit: ILRI/Wandera Ojanji.

A key initiative in this effort, she explained, is DTA—a cross-cutting mechanism designed to connect and integrate data across the CGIAR system. This integration is central to realizing the full potential of digital tools and scientific outputs. Milach likened this vision to the process of designing a new city on a blank landscape: success depends on intentional planning of foundational infrastructure—such as power lines, roads, and public utilities—to ensure seamless connectivity and functionality.

Translated into the context of CGIAR’s digital ecosystem, this “city map” approach envisions the strategic development of shared digital infrastructure and data pipelines across programs, species, and regions. This includes cloud services, data repositories, breeding and phenotyping pipelines, and image processing systems. Many such components already exist, and the accelerator will build upon this foundation with the participation of centers and partners across CGIAR.

The goal is to establish an architecture that allows individual research centers or programs to ‘plug in’ their digital components easily, like constructing a building on an already planned and equipped urban grid. By doing so, CGIAR will unlock the ability to link data across domains, enhance collaboration, and harness powerful tools such as digital twins and simulation platforms.

Milach emphasized that the true power of digital transformation lies in interconnectedness—the capacity to analyze challenges from multiple angles and in unison with global partners. Achieving this vision also requires clear data governance policies, with a strong focus on privacy, security, and ethical use of data.

4 Audience engagement via Menti

The session, facilitated by Lina Yassin, director, digital and data product management, digital services, CGIAR engaged participants using Menti to capture real-time insights on the state of digital innovation across CGIAR and its partners.

- **Audience composition:** Primarily CGIAR centers, international organizations, and government representatives, with a noted absence of private sector participation.
- **Key challenges identified:** Participants highlighted major barriers to digital acceleration, including data fragmentation, limited access to quality data, funding gaps, low digital literacy among end users, and weak collaboration frameworks.
- **Investment priorities:** When asked how to allocate resources for the greatest impact, respondents prioritized:
 - Delivering digital products with end users and market needs in mind.
 - Making data findable, accessible, interoperable, reusable (FAIR).
 - Capacity building, including AI capabilities.
 - Strengthening the innovation ecosystem through partnerships.
- **Gaps and opportunities noted:** Participants identified several overlooked areas, such as talent development, startup engagement, data governance, community involvement, infrastructure, and models for training and innovation.

The session underscored the importance of inclusive planning, strategic investment, and coordinated action in building a digitally enabled CGIAR ecosystem.

5 Introductory remarks by Ram Dhulipala, director, DTA

Ram Dhulipala gave a compelling narrative focused on a woman farmer in Kenya, illustrating how digital tools – affordable smartphones, data connectivity and services could transform her agricultural journey. In this envisioned future, the farmer benefits from:

- Access to improved seeds, quality inputs, and livestock breeds.
- Market intelligence and price forecasting.
- Climate- and crop-specific advisories.
- On-demand extension services and digital training.
- Enhanced access to credit and insurance products.

These capabilities, when fully realized, would improve productivity, increase incomes, and reduce risk, thereby strengthening resilience and livelihoods. However, he cautioned that this vision cannot be taken for granted. There are persistent challenges such as:

- Slow and costly development of agricultural technologies.
- Static, supply-driven extension services lacking personalization.
- Inconsistent and expensive data collection, essential for innovation and impact.
- Emerging threats like climate change and resource scarcity.



Ram Dhulipala, director, DTA, speaking at the strategy dialogue. Photo credit: ILRI/Wandera Ojanji.

Dhulipala argued that to overcome these hurdles and seize the opportunity offered by emerging digital tools—such as AI, machine learning (ML), Internet of Things (IoT) devices, and digital connectivity – CGIAR needs a coordinated, strategic approach. This is DTA's value proposition and approach which is structured around four core areas of work:

5.1 Enabling Environment

Creating foundational conditions to foster digital transformation:

- New partnership models, including engagement with startups and tech firms.
- Innovative and sustainable business models.
- Institutional capacity building, including leadership development.
- Infrastructure development to support digital systems.
- Institutional innovation to match evolving digital contexts.

5.2 Digital Futures

Equipping the system to anticipate and prepare for technological shifts:

- Horizon scanning and analysis of emerging tech trends.
- Piloting novel technologies.
- Strategy development and evidence generation to guide leadership decisions.

5.3 Action Lab

Designing and deploying digital innovations:

- Translating upstream science into user-friendly digital tools.
- Developing solution architectures and decision support platforms.
- Creating AI/ML models and user-centric applications.
- Promoting inclusive and human-centered design principles.

5.4 Data Ecosystem

Strengthening CGIAR's data infrastructure and governance:

- Enhancing data collection methodologies.
- Ensuring FAIR and AI-ready data.
- Enabling innovation through open and governed data ecosystems.
- Developing metadata standards and institutional data policies.

Together, these pillars support a vision where digital tools are equitable, inclusive, and transformative for farmers and food systems globally. Dhulipala concluded by pointing to the development of five flagship digital products (see next section) as tangible expressions of this strategy, designed to build a future-ready data ecosystem.

6 DTA flagship digital products

6.1 Data Collaborative



Andrea Gardeazábal Monsalve, monitoring, evaluation, and learning manager – ICT for Agriculture, at the International Maize and Wheat Improvement Center (CIMMYT), noted that while CGIAR has made substantial progress in developing tools, reference architectures, and data systems, the organization continues to operate in data silos. This fragmentation limits the ability to scale innovations and to align on key issues such as data governance. The Data Collaborative aims to be the primary vehicle for advancing data governance across CGIAR, ensuring consistent, FAIR and AI-ready data systems. The initiative seeks to move the system from isolated efforts to a structured, collaborative, and inclusive data governance – laying the groundwork for more integrated, impactful, and equitable digital innovation across the global agri-food system.

*Andrea Gardeazábal Monsalve, monitoring, evaluation, and learning manager – ICT for Agriculture, CIMMYT introduces Data Collaborative, a DTA flagship product.
Photo credit: ILRI/Wandera Ojanji*

The Data Collaborative will take the form of a multi-stakeholder governance body, with representation from:

- CGIAR director generals and center leadership.
- IT and digital infrastructure units.
- Science programs.
- Data and research teams from across centers.

This team, whose structure is intended to foster inclusivity, diverse perspectives, and organizational alignment will:

- Guide decision-making on FAIR and AI-ready data.
- Address fragmentation across CGIAR by breaking silos and promoting interoperability.
- Use collaborative, milestone-based processes to align key issues like tool adoption, data sharing, and system responsibilities.

6.2 Agriculture Platform Infrastructure Layer

Jawoo Koo, deputy director, DTA, presented the Agriculture Platform Infrastructure Layer (AgPile) flagship product, highlighting it as a foundational enabler for digital transformation within CGIAR. AgPile is designed to support and unify digital innovation efforts across the CGIAR network by providing reliable, trustworthy, and federated digital infrastructure.

At the core of AgPile is the development of a federated data architecture. Unlike centralized systems, a federated approach allows for the analysis and sharing of data without requiring the physical relocation of data assets. This ensures that:

- Data sovereignty is maintained by centers and programs.
- Existing governance structures and hosting arrangements remain intact.
- Data assets can still be used for collaborative and system-wide analytics.

AgPile aims to maximize the value of data by supporting all centers and research programs in making their data AI-ready and FAIR. In addition to the technical development of the shared infrastructure, Koo emphasized that AgPile is not purely a backend effort. The team will also:

- Establish a clear “city map” of CGIAR’s digital infrastructure, ensuring coherence and alignment.
- Facilitate a range of “plumbing” activities to connect systems and data flows across centers.
- Organize a series of hackathons to demonstrate and validate the utility of shared infrastructure.

6.3 Agricultural Large Language Models (AgriLLM)

Koo acknowledged the widespread and growing use of large language models (LLMs) and generative AI tools across sectors, including within CGIAR, where many of the presentation materials themselves had been refined with the help of such tools. However, he emphasized a critical limitation of current general-purpose LLMs: they are predominantly trained on data from the global North and often fail to capture the context-specific challenges and realities of smallholder farmers in the global South.

Recognizing this gap, DTA has initiated AgriLLM as a dedicated, agriculture-specific LLM, marking what is believed to be the world’s first initiative of its kind focused exclusively on agriculture. The development of AgriLLM is being undertaken in collaboration with:

- Falcon LLM team in the United Arab Emirates (UAE).
- CGIAR centers and research partners.
- World Bank, Food and Agriculture Organization of the United Nations (FAO), and other international organizations.



The initiative seeks to aggregate and integrate diverse agricultural data and domain-specific knowledge from across the globe to ensure that the model is representative, inclusive, and relevant for a wide range of agricultural systems, particularly in low- and middle-income countries.

Jawoo Koo, deputy director, DTA elaborates on AgPile and AgriLLM flagship products. Photo credit: ILRI/Wandera Ojanji

Koo outlined several core activities associated with the AgriLLM initiative:

- Development of a domain-specific training corpus incorporating CGIAR’s extensive research outputs and agricultural datasets.

- Creation of a benchmarking dataset to evaluate LLM performance in agricultural contexts.
- Establishment of a custom evaluation framework to ensure reliability, relevance, and applicability in real-world scenarios.

The goal is to build AgriLLM as a global public good—an open, accessible resource that enhances agricultural research, innovation, and extension services globally.

6.4 Digital Twins



Daniel Jimenez, senior scientist, Alliance of Bioversity and CIAT, contextualized the overarching goal of Digital Twins: to ensure that CGIAR remains at the forefront of digital innovation. Digital Twins focuses on horizon scanning, identifying emerging digital trends, and evaluating their relevance and potential application within CGIAR’s research and development ecosystem.

Daniel Jimenez, senior scientist, Alliance of Bioversity and CIAT introducing Digital Twins. Photo credit: ILRI/Wandera Ojanji

Jimenez emphasized the importance of strategic foresight and critical thinking to anticipate and evaluate transformative digital technologies. This proactive approach enables CGIAR to identify and act upon strategic opportunities in the digital space, particularly those that can enhance the organization’s capacity to deliver timely, data-driven solutions in the context of complex and evolving challenges in agriculture.

Jimenez explained that digital twins are virtual models that replicate real-world systems—specifically, food, land, and water systems in this context. These models enable dynamic simulation and real-time monitoring, supporting improved decision-making in the face of climate variability, market fluctuations, and other risks.

The challenge, as he outlined, is that many agricultural decision-makers currently lack access to real-time data insights. Digital Twins can address this gap by providing timely, system-level intelligence to inform policy and practice.

6.5 AI Hub

Leroy Mwanzia, head of digital and data, International Potato Center (CIP), highlighted the complex and evolving challenges facing food, land, and water systems—ranging from climate change to rapid population growth. In response to these mounting pressures, he emphasized the need for both breakthrough innovations, such as AI, and continuous, adaptive improvements to existing systems. However, he stressed that no single actor or institution, including CGIAR, can address these challenges alone. Instead, the solution lies in cultivating collaborative, networked ecosystems that combine technological innovation with local insights at scale.

In this context, Mwanzia introduced the CGIAR AI Hub, a strategic initiative supported by funding from UAE and the Bill & Melinda Gates Foundation, in collaboration with the Technology Innovation Institute of the UAE's Advanced Technology Research Council (ATRC). Importantly, this AI Hub is not envisioned as a standalone entity, but rather as a node within a broader decentralized innovation network. Its purpose is to connect global AI expertise with regional priorities and partner needs, while remaining responsive to the dynamic research demands within CGIAR.

The AI Hub will serve as CGIAR's global platform for AI-enabled research and innovation, providing infrastructure, technical expertise, and collaborative spaces to CGIAR centers and their partners. Its core objectives include:

- Building and sharing AI capacity across CGIAR and its networks.
- Co-designing solutions with partners that are locally grounded and contextually relevant.
- Ensuring that innovations are responsible, ethically sound, and equity driven.
- Fostering a collaborative, evolving learning network that brings together diverse regions, institutions, and disciplines.

Mwanzia outlined the direct benefits of the AI Hub for various stakeholders:

- For researchers, it will enable faster discovery through improved data access and AI tools.
- For partners, it will facilitate shared access to advanced AI capabilities and collaborative development.
- For communities, it will help ensure that solutions are shaped by local realities and needs.

He concluded by framing the AI Hub not only as a platform, but as the foundation of a long-term, future-oriented digital innovation strategy for CGIAR—designed to adapt, connect, and scale impactful solutions across geographies and sectors.



*Leroy Mwanzia, head of digital and data, CIP introduces the CGIAR AI Hub to the participants.
Photo credit: ILRI/Wandera Ojanji.*

7 DTA strategy dialogue panels

7.1 Panel 1: Theme: Agricultural advisories in the age of digital networks and digital public infrastructure (DPI)



Jacob van Etten, principal scientist and director, Digital Inclusion Research Program, Alliance of Bioversity International & CIAT, moderating panelists (from left): Kirti Pandey, mission director, OpenAgriNet; Jacqueline Wang'ombe, data scientist and project manager, Digital Green; Sheena Raikundalia, chief growth officer at Kuza; and Salim Kinyumi, director, ICT, KALRO (photo credit: ILRI/Wandera Ojanji).

Panelists:

- Kirti Pandey, mission director, OpenAgriNet.
- Sheena Raikundalia, chief growth officer at Kuza.
- Jacqueline Wang'ombe, data scientist and project manager, Digital Green.
- Salim Kinyumi, director, ICT, KALRO.

Moderator:

Jacob van Etten, principal scientist and director, Digital Inclusion Research Program, Alliance of Bioversity International & CIAT.

Jacob van Etten welcomed participants to the session focusing on the evolving landscape of agricultural extension services in the digital era. The session convened a panel of four experts representing organizations that operate at the frontline of digital innovation, with particular emphasis on farmer engagement and advisory systems.

In his introduction, van Etten emphasized the centrality of farmers and rural communities in CGIAR's mission, describing them as “the most important stakeholders” in the research-for-development continuum. He noted that the panelists were uniquely positioned to discuss the interface between science, innovation, and practical field-level implementation, particularly through digital advisory services and infrastructure.

The session aimed to explore the transformative role of digital public infrastructure and networked technologies in reshaping how agricultural knowledge and innovations are delivered to end users. Topics for discussion included:

- How digital tools can enhance the reach, speed, and personalization of agricultural extension.
- The role of public-private collaboration in developing scalable solutions.
- The importance of inclusivity and accessibility in digital agricultural services.
- Emerging models for farmer-centered innovation ecosystems.

Pandey responding to: What do you think CGIAR could be providing to your organization in terms of science and information that could be useful for your work? We may have the tools, but are we truly reaching the smallholder farmers?

She emphasized the importance of digital public infrastructure (DPI) – open, secure, and federated systems – to connect data hubs and make advisory, market, and extension services accessible.

Pandey emphasized the gap between the rapid advancement of digital agriculture technologies and their actual reach to smallholder farmers. She introduced Open AgriNet work in DPI that leverages AI and open protocols to provide voice-based, contextual advisory services to farmers, while maintaining data sovereignty through a federated architecture. The ecosystem is not yet built to serve them effectively.

She underscored the importance of scaling inclusive access, citing a pilot project in Maharashtra, India, focused on climate-resilient agriculture. Pandey called on CGIAR to play a key role by contributing credible, science-backed information to such platforms, comparing the opportunity to India's transformative Unified Payment Interface movement. She concluded that CGIAR's research and data could help ensure farmers receive reliable, accountable, and localized agricultural knowledge.

Wang'ombe's take on: What more can CGIAR do in partnership with Digital Green, and where are the benefits of such collaboration?

Nereah emphasized the importance of user research in building effective digital tools. She shared that farmers often seek more than just advisory services - they want access to markets, planning support, and actionable insights tailored to their unique challenges.

Digital Green has seen success in India, Kenya, and Nigeria, particularly in delivering site-specific fertilizer recommendations, which led to a 38% increase in productivity in a single season. Wang'ombe highlighted the need for:

- Faster access to up-to-date research and tools
- Two-way feedback loops between scientists and farmers
- Multi-stakeholder collaboration for ecosystem-wide solutions

Raikundalia presented KUZA's blended 'people plus platform' model, which trains rural youth to deliver agricultural advisory services via a digital platform that operates offline and supports 42 value chains in 10 languages. KUZA's approach emphasizes contextualized learning, market connectivity, and localized extension.

She highlighted key partnership opportunities with CGIAR:

- Simplifying science for farmers by converting complex research into engaging, easy-to-understand formats like short videos.
- Creating two-way feedback loops to allow real-time farmer input on CGIAR innovations.
- Linking productivity to income by ensuring increased yields leads to better market access and fair prices.
- Framing climate-smart practices in terms of financial benefits to encourage adoption.
- Reimagining smallholder agriculture through youth-led, community-driven agribusiness models.

She called on CGIAR to shift from a production-centric view to a broader, market-focused approach and to become an active participant in a more collaborative and integrated agricultural innovation ecosystem.

Kinyumi take on: what CGIAR could do together with KALRO to advance digital transformation in Kenya?

Kinyumi provided a public sector lens, stressing the role of government in:

- Providing the digital backbone for agricultural services.
- Leveraging data to inform national strategies.
- Working with the private sector and research institutions to co-design farmer-friendly tools.

He underscored the value of open data, precision agriculture, and collaborative innovation. He also called for:

- More timely and relevant data from CGIAR.
- Capacity building—both technical and human-centered.
- Stronger integration of design thinking in agriculture, to ensure tools meet real-world needs.

Kinyumi identified three core areas where collaboration with CGIAR could strengthen national digital agriculture efforts:

1. **Data integration and enrichment:** KALRO has already begun aggregating key agricultural datasets to support the shift from subsistence to precision and commercial farming. CGIAR can contribute by linking national datasets with global data repositories to enhance insights, foster interoperability, and enable more informed decision-making at both the farm and policy levels.
2. **Capacity building in emerging technologies:** The government faces constraints in recruiting and retaining high-level digital talent (e.g., AI engineers, data scientists) due to budgetary and structural limitations. CGIAR's support through collaborative capacity-building initiatives—particularly in human and technical resource development—could significantly boost national digital capabilities.
3. **Co-design of farmer-centric digital tools:** While KALRO has developed several digital tools for farmers, there is a recognized need for deeper collaboration with CGIAR to accelerate the development of more precise, accurate, and context-specific digital solutions. These tools should support both individual farmers and broader policy-making objectives.

The discussion emphasized a few key takeaways for CGIAR and the broader research-for-development community:

- Move from static datasets to dynamic data streams
- Focus on co-creation and participatory design of digital solutions
- Prioritize localization, trust-building, and inclusivity
- Treat research as part of a broader ecosystem of services for farmers, not just as a one-way flow of information.

As CGIAR and partners co-develop digital flagship products, this dialogue affirms the need for multi-actor collaboration, grounded in local realities and user-driven insights.

7.2 Panel 2: Theme: Emerging donor and implementor landscape around digital transformation of food, land and water systems



Parmesh Shah (center), global lead, Rural Livelihoods and Digital Investments, World Bank, contributing during the panel discussion on emerging donor & implementor landscape around digital transformation of food, land & water systems as fellow panelists Kristofer Hamel (right), Office of International Affairs, Presidential Court, UAE; and Christian Merz, program lead, FAIR Forward, GIZ keenly follow. The session was moderated by Medha Devare (standing), chief data officer, excellence in agronomy, Big Data Platform.

Panelists:

- Parmesh Shah, global lead, Rural Livelihoods and Digital Investments, World Bank.
- Kristofer Hamel, Office of International Affairs, Presidential Court, UAE.
- Christian Merz, program lead, FAIR Forward, GIZ.

Moderator:

Medha Devare, Chief Data Officer, Excellence in Agronomy, Big Data Platform.

Shah prompt: Based on your long-standing experience in digital agriculture, what would you identify as the top one to three priorities for the Digital Transformation Accelerator? Where do you foresee key opportunities and challenges, particularly in areas like data, partnerships, capacity, and innovation?

Shah, speaking in his capacity as the World Bank's global lead for Data and Digital Agriculture Innovation, emphasized the need for greater coherence and usability in the digital agriculture space. He highlighted the World Bank's current portfolio of 68 digital and data-focused agricultural investments totaling approximately USD 1.4 billion—most of which emerged in response to the digital demands exposed by the COVID-19 pandemic.

Shah outlined three top priorities for the CGIAR DTA, drawing on his global experience and engagement with digital agriculture ecosystems:

1. Breaking data fragmentation and enhancing usability.
 - The current data landscape within CGIAR and beyond is highly fragmented and siloed - both internally (within CGIAR centers) and externally (with other global partners).

- Users often rely on personal networks to access information, which limits broader utilization.
- Shah advocated for CGIAR to evolve into a “one-stop digital data platform”, enabled by AI tools (e.g., chatbots) to enhance discoverability, access, and integration of its vast datasets.
- He stressed that CGIAR has already been commendably open with its data and noted that the World Bank currently integrates 91,000 datasets – including many from CGIAR – into its internal knowledge platforms.
- A significant institutional shift is needed to reverse the current situation where 70% of time is spent accessing data, 20% analyzing it, and only 10% using it. This ratio, he emphasized, must be inverted.

2. Consolidating innovation platforms

- Digital innovation is currently dispersed, with thousands of agri-tech startups and innovations emerging globally, many of which remain isolated or underutilized.
- Shah suggested CGIAR create thematic platforms to integrate these innovations in a structured, accessible manner. He cited the World Bank’s efforts to organize AI applications around core themes such as soil fertility, low-methane rice, crop forecasting, and traceability. These focused themes serve to channel scattered innovation into actionable, high impact use cases.
- Additionally, the World Bank has leveraged AI to distill long-form learning (e.g., webinars) into digestible, three-minute knowledge snippets—an approach that could be replicated within CGIAR’s innovation dissemination.

3. Maximizing return on existing investments

- Shah emphasized the importance of optimizing and scaling existing data and research investments before initiating new data collection exercises.
- He noted that although the World Bank has invested USD 33 billion in CGIAR-related initiatives over time, there is still a disconnect in accessing and leveraging CGIAR data to inform ongoing and future World Bank projects.
- The accelerator, in his view, should be positioned as a global collaboration platform, not simply a CGIAR project. It must serve both internal (CGIAR) and external (global donors and implementors) constituencies.
- He urged the accelerator to function as a strategic multiplier, improving the utility and impact of past and present investments in agricultural science and innovation.

Hamel prompt: As a close partner of DTA and a representative of the UAE, where do you see the alignment of priorities between the accelerator and UAE’s interests? Do you have any advice for how the accelerator could improve its impact?

Hamel provided an articulate overview of the UAE’s emerging partnership with CGIAR, underlining the country’s commitment to supporting and advancing digital transformation in agricultural research and development, particularly through AI. He structured his remarks around three key elements: the UAE’s commitment, the national context and comparative advantages, and concrete contributions.

1. **UAE’s strategic commitment to the agenda:** UAE is committed to championing the digital transformation agenda, not only within CGIAR but across the broader global agriculture and research community. As a newly joined member of the CGIAR System Council, the UAE views this partnership as a strategic opportunity to contribute meaningfully to international cooperation in agricultural innovation.

2. **National context and comparative advantage:** He identified three interlinked areas where the UAE's national experience provides a strong foundation for contributing to CGIAR's digital transformation efforts:
- **Overcoming food security challenges through innovation:** Despite its resource constraints in areas such as arable land and water, the UAE has made significant strides in food security raising notably in global food security indices. This success has been achieved through a robust policy environment and strategic investment in innovation, particularly in agri-tech and sustainable food systems.
 - **Leadership in AI:** AI is central to the UAE's domestic policy and governance agenda. Notably, the UAE was the first country to appoint a Minister for AI (in 2020) and currently has over 200 AI-focused projects across its government. This level of commitment reflects a strategic view of AI as a tool for accelerating development and improving governance.
 - **Global AI cooperation and diplomacy:** The UAE is actively expanding its AI-focused international partnerships, including recent initiatives with France, Italy, and the United States, as well as substantial investments in data infrastructure. Hamel described this international engagement as part of a deliberate strategy to leverage AI for global cooperation, with agricultural innovation positioned as a key domain of interest.
3. **Concrete contributions and vision going forward:** Hamel outlined several ways the UAE is concretely contributing to CGIAR's digital transformation efforts:
- **Investment in DTA:** Beyond general financial contributions through CGIAR's Window 1 funding, the UAE is directly investing in the accelerator initiative, signifying its intention to be a core partner in this effort.
 - **Establishment of the CGIAR AI Hub in Abu Dhabi:** UAE will host the CGIAR AI Hub, launching later this year, which is envisioned as a global nexus for AI-enabled agricultural solutions. This hub will offer computing power, technical expertise, and a collaborative platform for joint problem-solving among CGIAR partners and stakeholders.
 - **Openness to expanding the partnership:** While the accelerator and AI Hub are key focal points, the UAE's approach remains flexible and product oriented. Hamel emphasized the importance of developing scalable, community-serving tools like the AgriLLM, currently under development—as a model for how AI solutions can emerge through multi-stakeholder collaboration.

He concluded by inviting the CGIAR community to think creatively about additional cross-cutting products and tools that can enhance digital transformation in agricultural systems, positioning the UAE as an enabler and convener in this space.

Merz prompt: With your extensive experience in structuring investments at institutions such as the Gates Foundation and GIZ, and working with partners like CGIAR, what strengths do you see in DTA? Additionally, could you share potential pitfalls to avoid, based on your learning from other investments?

Merz highlighted several strengths within CGIAR that could be further leveraged by the accelerator:

- **Historical leadership in data-driven science:** CGIAR has significant experience with large-scale agricultural data through initiatives such as the CGIAR Big Data Platform. This platform had already laid the groundwork for open, FAIR data practices, and linked data with innovative activities through mechanisms like the Inspire Challenge.
- **Effective pairing of data and innovation:** The previous integration of data initiatives with application-level innovation (as in Inspire Challenges) was cited as a model worth continuing. It allows CGIAR to 'pressure test' its datasets by linking them to real-world problem solving.

- **Flexibility of AI with unstructured data:** Merz noted that AI can process unstructured data effectively, which expands the types of inputs CGIAR can utilize—ranging from text documents and research papers to social media posts and citizen science contributions.

Key considerations for improvement

- **Machine readability of data:** Data should be stored in machine-readable formats (e.g., TXT over PDF) to enable efficient processing by AI tools.
- **Data governance and accessibility:** Simply posting data to an open repository is insufficient. CGIAR should carefully consider:
 - Operationalization (how data is hosted and accessed).
 - Licensing (clarity on reuse and rights).
 - Metadata (details about data quality, update frequency, and verification protocols).
- **User feedback loops and demand-driven innovation:** Technologies like conversational AI allow for easy tracking of user queries and interactions, which helps identify the most valuable information. This feedback should guide which datasets are prioritized, processed, and even translated into local languages for broader accessibility.
- **Integration with LLM initiatives:** Merz emphasized the potential synergy between CGIAR and initiatives like Agri-LLM, a large language model for agriculture developed using Falcon from the UAE. Such tools can be used to bridge language barriers and enhance the usability of CGIAR's extensive knowledge base.

Vision for success

The session explored visions of success for DTA, with insights from the panelists:

- Hamel emphasized the need for a bold, product-oriented vision, urging the accelerator to aim for transformational digital tools that directly benefit smallholder farmers and researchers.
- Shah focused on scale and usage, advocating for targets like 100 million farmers using digitally enabled services.
- Merz highlighted the importance of 'meaningful usage', beyond registration - measured by repeated use and perceived benefit. He stressed the need for inclusive design, especially for low-literacy users, and tailoring solutions to diverse farmer profiles.

Together, the speakers called for a strategy that prioritizes ambitious vision, scale, real-world adoption, and inclusivity, ensuring that digital transformation efforts lead to measurable, equitable impact across global food, land, and water systems.

8 Fireside chat with Anthony Whitbread, research director, dryland systems, ICRISAT



Anthony Whitbread, Program Leader, Livestock, Climate, Environment, ILRI (photo credit: ILRI/Wandera Ojanji).

Whitbread offered key reflections on the role and potential of digital transformation in addressing the challenges faced by smallholder farmers, particularly in dryland and mixed farming systems:

- Complex challenges require digital solutions: Digital tools offer critical pathways to address intractable issues in smallholder agriculture and livestock systems, including climate extremes, economic constraints, market failures, and poor service connectivity.
- Inclusion of livestock systems: Livestock remains underrepresented in digital agriculture discourse. Many smallholders are mixed farmers; hence, digital solutions must equally cater to livestock keepers.
- Aggregation as a lever for impact: Digital technologies enable aggregation of farmers, a crucial strategy to address input supply bottlenecks and improve market access.
- User-centered design: A nuanced understanding of end users is essential. Often, the farmer is not the direct user but rather intermediaries such as extension agents or service providers. Solutions should be designed accordingly and avoid fragmentation by ensuring coherence across different information streams (e.g., weather, pest, market data).
- Job creation and youth engagement: Digital innovation presents strong potential for youth employment. Many funding proposals now integrate job creation as a key objective.
- Systems thinking is essential: Digital transformation must approach agriculture as a complex system. Farmers need interconnected support—beyond single-topic solutions—and sometimes require non-agricultural income pathways facilitated by digital connectivity.
- Digital for transformation and equity: Digital tools hold transformative power to build resilience, inclusivity, and equity across food, land, and water systems, especially in the Global South.

9 Closing remarks, Micheline Ayoub, chief of staff, CGIAR



Ayoub, underscored the critical importance of digital innovation in transforming food, land, and water systems, particularly in the global South. She emphasized that while today's discussions revealed the challenges involved, they also illuminated tremendous opportunities to leverage digital technologies to promote resilience, inclusivity, and equity. These opportunities, she noted, must be harnessed for the benefit of a wide range of stakeholders, from smallholder farmers and policymakers to researchers and private sector actors.

Micheline Ayoub, chief of staff to the Executive Managing Director, CGIAR, Officially closing the strategy dialogue.
Photo credit: ILRI/Wandera Ojanji

Reflecting on the emerging themes, she highlighted the session's focus on AI and big data analytics as tools that can shape evidence-based policymaking and guide more strategic investment decisions. These technologies have already demonstrated their transformative potential in other parts of the world, and Ayoub expressed confidence in CGIAR's capacity to bring similar advances to its priority regions.

However, she was clear that achieving true digital transformation goes beyond technology alone. It requires inclusive, collaborative action. Governments, research institutions, the private sector, and local communities must work together to co-design and implement solutions that are context-specific and scalable. Furthermore, she stressed that these solutions must be accessible, ethical, and people-centered, ensuring that no one is left behind—especially in underserved and vulnerable communities.

Ayoub reiterated the importance of environmental, social, and economic sustainability in all digital initiatives. She encouraged ongoing engagement from all stakeholders, noting that digital transformation is a shared journey that requires contributions from across disciplines. "You do not have to be a techie to be part of this," she remarked, emphasizing that expertise in agriculture, policy, finance, and development all have a vital role to play.

As DTA continues to evolve as a platform for innovation, partnership, and impact, Ayoub extended a strong call to action for continued collaboration, bold thinking, and collective responsibility to ensure that digital transformation delivers real, lasting change for communities across the globe. She concluded by reiterating her core message that digital transformation must itself be sustainable - environmentally, socially, and economically - and accessible to all, especially in the global South."