Investing in rural people

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Strategic discussion with the President of IFAD – Advancing IFAD's digital agriculture vision for rural transformation (2025–2030)

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Strategic discussion with the President of IFAD – Advancing IFAD's digital agriculture vision for rural transformation (2025–2030)

I. Introduction

1. **Digital agriculture and rural transformation.** Digital agriculture uses digital technologies and data to enhance agricultural productivity, improve value chain efficiency and support informed decision-making. This includes tools like geospatial data, the Internet of Things, artificial intelligence (AI), and platforms for finance, advisory services and market access.[1]

2. **Digital transformation is reshaping agriculture.** In 2024, 5.5 billion people (68 per cent of the global population) were online.[2] Mobile internet adoption continues to grow, with 57 per cent of the global population using this technology. These shifts present an opportunity to extend digital services to rural producers, enabling smallholders to benefit from higher yields, fewer losses, better financial access and stronger market linkages.

3. **Integrating digital technologies into rural economies makes agrifood systems more sustainable**,[3] a key requirement for achieving the Sustainable Development Goals (SDGs). Digitalization could increase global productivity and contribute US$500 billion annually to the global economy by 2030.[4]

4. **Digital public infrastructure (DPI) and farmer registries** are foundational to unlocking agricultural digitalization. DPI provides the backbone for digital services, while farmer registries offer the baseline data needed to enable targeted delivery.[5]

5. **Emerging technologies** like AI, the Internet of Things and machine learning offer potential to improve decision-making, optimize input use and boost productivity. Inclusion and affordability must be addressed, however, to ensure equitable benefits for rural populations.

6. **Smallholder producers** face weather and market access risks. Digital technologies can help farmers mitigate risks, optimize resources and become more competitive,[6] providing agronomic information and early warning signals.[7]

7. **Realizing the full potential of digital agriculture requires supportive policies and enabling environments**. Strong data governance is critical to fostering innovation and inclusive digital ecosystems.[8] Governments play a central role by establishing supportive regulations, investing in foundational digital infrastructure and promoting public-private partnerships.

II. Strategic context

A. Why digital agriculture matters for IFAD.

8. **Key trends in rural digitalization.** The agriculture sector employs over a quarter of the global workforce.[9] By 2030, mobile technologies may contribute as much as

[1] https://www.researchgate.net/publication/378292073_Digital_Agriculture_Revolutionizing_Farming_Practices_through_Technology_Integration.
[2] https://www.itu.int/itu-d/reports/statistics/facts-figures-2024/.
[3] https://www.fao.org/newsroom/detail/digitalization--it-is-time-to-bridge-the-gap-between-urban-and-rural-areas/en.
[4] https://www.unescap.org/sites/default/d8files/knowledge-products/AWP-FDI-2_Premila%20Satyanand_final.pdf.
[5] https://www.fao.org/e-agriculture/news/transforming-agrifood-systems-digital-public-infrastructure-one-paths-sustainable-development%C2%A0.
[6] https://openknowledge.fao.org/server/api/core/bitstreams/d9878e4d-17dc-4584-b8f4-9ec6127fd125/content.
[7] https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/wp-content/uploads/2022/09/Data-driven-advisory-services-for-climate-smart-smallholder-agriculture.pdf.
[8] https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3431739.
[9] https://www.fao.org/statistics/highlights-archive/highlights-detail/employment-indicators-2000-2022-(september-2024-update)/en.

8.4 per cent of global GDP (around US$11 trillion).[10] In lower-middle-income countries, the number of digital technology users is expected to rise from 50 million in 2020 to 224 million by 2030.[11] The global digital agriculture market is projected to grow from US$12.18 billion in 2021 to over US$34 billion by 2030.

9. As emerging digital technologies become more available, inefficiencies in traditional agricultural markets are exposed, generating demand for smarter solutions that reduce rural poverty.[12] These solutions include: (i) market information and transaction systems that enhance price transparency and empower farmers to make informed decisions; (ii) digital traceability tools to reduce food losses and improve value chain efficiency; and (iii) mobile financial services, which processed transactions totalling US$1.68 trillion in 2024,[13] opening up new pathways for rural finance, remittances, insurance and investment.

10. **Challenges, risks and gaps.** Barriers to digital transformation include connectivity gaps and high costs. In 2024, only 48 per cent of rural populations were online versus 83 per cent in urban areas.[14] Gender disparities continue to persist, requiring inclusive strategies. Fragmented systems, siloed initiatives and underdeveloped policies limit scale and innovation. IFAD-supported digital projects often remain in pilot stages due to budget constraints, weak infrastructure and limited staff capacity. These gaps risk worsening inequalities for women, youth and remote communities.

11. **IFAD's overall digital value proposition to Member States.** IFAD's digital value proposition is not about technology for its own sake; it is about enabling more efficient and inclusive delivery of sustainable services to small-scale producers. Digital solutions help address systemic obstacles such as lack of digital literacy, limited extension services, weak monitoring and data systems, market barriers and financial exclusion. IFAD leverages both in-house expertise and external partnerships to support Member States. As part of project design teams, IFAD provides capacity development for project management units and actively participate in policy dialogues and in shaping national strategies and frameworks to strengthen country-level digital ecosystems.

12. **Commitments under the Thirteenth Replenishment of IFAD's Resources (IFAD13).** At least 20 projects will include information and communications technologies for development (ICT4D) and innovation, reinforcing digital inclusion. IFAD can help to scale up interoperable systems and deepen partnerships with the private sector, governments and development actors to advance digital agriculture initiatives with the aim of piloting and testing product innovations that can be integrated and taken to scale within IFAD's investment portfolio; and enhancing target group access to market information and services.

B. IFAD's experience, insights and lessons learned

13. IFAD's ICT4D/Digital Agriculture Strategy (2020–2030),[15] approved in 2019, focuses on four action areas: (i) promoting scalable uptake of ICT4D solutions; (ii) strengthening ICT4D partnerships; (iii) enhancing ICT4D knowledge management and sharing; and (iv) building internal ICT4D awareness, capacity and

[10] https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-economy/.
[11] https://www.beanstalkagtech.com/d4aglmic.
[12] https://www.researchgate.net/publication/351368776_Drivers_barriers_and_impacts_of_digitalisation_in_rural_areas_from_the_viewpoint_of_experts.
[13] https://www.gsma.com/newsroom/press-release/mobile-money-surpasses-two-billion-registered-accounts-and-over-half-a-billion-monthly-active-users-globally/.
[14] https://www.itu.int/en/mediacentre/Pages/PR-2024-11-27-facts-and-figures.aspx.
[15] IFAD's ICT4D Strategy is now being referred to as the ICT4D/Digital Agriculture Strategy, reflecting the evolution of IFAD's approach from a focus primarily on ICT4D towards a broader and more integrated vision of digital agriculture. While ICT4D emphasizes the use of digital tools for development outcomes, the broader terminology acknowledges the strategic shift towards embedding digital systems, infrastructure and transformation processes across IFAD's programmes and operations.

leadership. The goal is to leverage ICT to enhance productivity, market access and resilience for IFAD project beneficiaries.

14. Under IFAD12, IFAD incorporated digital technologies into more than 45 projects and approximately 75 per cent of country strategies. An internal ICT4D stocktake (2023–2024) indicates that agronomic advisory services and e-commerce represent the most prevalent applications of ICT within IFAD-financed initiatives. Nevertheless, numerous interventions remain at the pilot stage, with persistent inclusion gaps affecting women and farmers with low digital literacy. Scaling up will require enhanced ownership, increased financing and strengthened partnerships.

15. Lessons from internal reviews and evaluations highlight the importance of treating DPI and farmer registries as priority investments. The African Union's Digital Agriculture Strategy (2024–2030)[16] identifies national farmer registries and interoperable DPI as essential for enabling digital agriculture, improving service delivery, eliminating fragmentation and ensuring data sovereignty across the continent.

16. **Portfolio approach.** To prevent digital interventions from remaining at the pilot stage and facilitate scaling up, IFAD is employing a portfolio approach. This involves designing and implementing multiple, interrelated digital initiatives under a unified strategic plan in a country. The portfolio approach ensures complementary, scalable initiatives aligned with broader corporate and national objectives.

17. **Digital services bundling.** Accessibility remains central to IFAD's digitalization vision. IFAD integrates multiple digital services – such as advisory services, inputs, e-commerce, digital payments and market access – within single projects or platforms. This comprehensive approach enhances adoption while encouraging private sector partnerships to support scalability.

Box 1
Examples of IFAD's approach

- IFAD acknowledges the increasing significance of national investments in DPI, including government digital identification and payment systems, which are fundamental to integrated service delivery. In targeted initiatives, IFAD has facilitated the expansion of digital financial services – such as mobile banking, e-wallets and e-vouchers – by utilizing existing public digital platforms. For instance, the Jordan Payments and Clearing Company (JoPACC) platform has been employed to distribute e-wallet grants within the Rural Economic Growth and Employment Project, while the Kenya Cereal Enhancement Programme – Climate-Resilient Agricultural Livelihoods Window has applied farmer data to implement e-voucher systems that are integrated with financial and insurance services. Moving forward, IFAD aims to deepen its collaboration with Member States in developing DPI frameworks, including the integration of digital IDs, to enable scalable and inclusive access to finance, subsidies and extension services. The Open Agri Connect grant for Rwanda and Nigeria represents an initial step towards broader investment in DPI and digital ID solutions through farmer registries.
- Through the Livelihood Improvement Family Enterprises Project in the Niger Delta of Nigeria, IFAD has leveraged AI and natural language processing to support farmers through engagement with local institutions to deliver agricultural advisory services, thereby ensuring better adoption through enhanced relevance and language alignment.

18. **Adoption of emerging technologies.** By employing emerging technologies such as AI, IFAD is able to offer opportunities through advanced digital services for productivity and sustainability as well as improved targeting and precision in programme delivery.

C. Insights from partner institutions

19. A range of partner institutions are playing pivotal roles in advancing digital agriculture globally. The World Bank supports governments in developing national digital agriculture roadmaps, strengthening data ecosystems and investing in infrastructure at scale. The African Development Bank (AfDB), through the Technologies for African Agricultural Transformation programme, invests in digital advisory platforms, e-markets and capacity-building for rural youth. The Food and

[16] https://au.int/sites/default/files/documents/43481-doc-DAS_EN.pdf.

Agriculture Organization of the United Nations (FAO) assists governments in developing digital agriculture frameworks and tools such as eLocust, the Hand-in-Hand Geospatial Platform and AI-powered early warning systems. Concurrently, CGIAR spearheads research on digital innovations, including AI for breeding, digital genotype-phenotype databases and climate-smart decision support tools. The Inter-American Development Bank plays a key role in Latin America and the Caribbean by financing broadband infrastructure, supporting agritech hubs and promoting data-driven agricultural policies via regional platforms and public-private partnerships.

III. Partnership landscape and IFAD's collaborative niche

20. Unlike other development finance institutions that focus on policy reform or large-scale ICT investments, IFAD's comparative advantage lies in maximizing impact on smallholder farmers by ensuring effective first-mile digital service delivery. This involves being an advocate for developing farmer-oriented digital services, de-risking innovation and embedding equality in IFAD's programming.

21. IFAD collaborates with a wide range of stakeholders to advance digital agriculture. Government institutions, particularly ministries of agriculture, are critical for integrating digital solutions into extension services, climate advisory services and broader national digital strategies. Private sector players, including technology firms (agritech and fintech companies) and mobile network operators, are key for developing platforms and enabling first-mile delivery. Financial institutions provide infrastructure for digital services such as credit and insurance.

22. Development partners such as the Asian Development Bank (ADB), the Organization of the Petroleum Exporting Countries (OPEC) Fund for International Development (OFID) and Agence Française de Développement, the French development cooperation agency, have been instrumental in cofinancing digital investment projects, providing technical assistance and facilitating knowledge-sharing and South-South and Triangular Cooperation (SSTC). Donors such as the European Union, the Global Environment Facility and the Ministry of Foreign Affairs of the Republic of Korea have provided supplementary financing for digital innovation. Farmers' organizations are instrumental in facilitating the adoption of digital technologies by engaging with lead farmers.

23. **Strategic partnerships for scaling up digital innovation.** IFAD leverages strategic partnerships to scale up innovation. In collaboration with the Islamic Development Bank and FAO, IFAD launched a report mapping 120 affordable and transferable climate-smart technologies across six domains, including post-harvest management, e-commerce, green energy and fintech.[17] In Nigeria, IFAD partnered with Digital Green to pilot FarmerChat, an AI-enabled agricultural assistant that provides localized, language-accessible advisory services to farmers.

24. **Policy support and strategy alignment.** Enabling policies are crucial for digital transformation. In the United Republic of Tanzania, IFAD supported the development of a national digital agriculture strategy. In partnership with the World Bank and the Gates Foundation, the Fund has also collaborated with the Government of Ethiopia on digital agriculture roadmaps and is contributing to similar efforts in Kenya. In Colombia and Peru, IFAD has collaborated with national partners to advance digital inclusion strategies focused on women and Indigenous producers, in line with the food security agenda of the Community of Latin American and Caribbean States. These efforts have helped Member States create enabling environments, strengthen digital integration in IFAD operations and align with regional transformation agendas.

[17] https://www.fao.org/neareast/news/details/fao-isdb-ifad-launch-the-tripartite-report-on-mapping-of-affordable-and-transferrable-climate-smart-technologies-for-smallholders/en#:~:text=Under%20the%20umbrella%20of%20the,Regional%20Director%2C%20NEN%2C%20IFAD.

IV. Future strategic directions for rural digital agriculture

25. **Vision and ambition for rural digital agriculture (2025–2030).** Investing in digital services as part of IFAD's programme delivery will harness the increasing availability of mobile technologies in rural areas, where approximately 500 million smallholders depend on farming for their livelihoods.[18] The IFAD13 Results Management Framework includes a commitment to integrate innovative approaches, including ICT4D, in at least 20 projects.

26. Building on the current ICT4D/Digital Agriculture Strategy (2020–2030), this strategic paper affirms IFAD's vision and ambition for rural digitalization. It recognizes the changing landscape and focuses on key strategic opportunities for future investment projects to enhance agricultural productivity, improve market access and strengthen financial inclusion.

27. To maximize impact beyond 2025, it is proposed that IFAD build critical mass in three key strategic priority areas, while maintaining a focus on innovative, scalable and sustainable digital solutions.

A. Priority 1: Farmer registries and digital public infrastructure for agriculture transformation

28. DPI refers to the foundational digital systems and platforms that support connectivity, enable the delivery of essential services, facilitate data exchange and support digital governance across the agricultural sector. DPI in agriculture consists of digital identity systems, payment platforms and data on climate, soil health and crops, along with data exchange protocols that are scalable, interoperable and accessible to both government and private stakeholders.

29. Farmer registries are structured databases capturing key data on farmers, such as land size, crops, production activities and relevant socioeconomic data. They are critical for delivering targeted subsidies and digitally enabled services for improved food security.

30. Integrating farmer registries into broader DPI frameworks enhances interoperability with other systems, such as national identification and payment systems; it also strengthens data-driven policymaking and improves access to digital services for smallholder farmers.

31. **Value proposition for IFAD.** The adoption of scalable, interoperable digital solutions significantly improves IFAD's operational efficiency and programme effectiveness, resulting in sustainable benefits for smallholder producers. Strategic investments in context-appropriate DPI, particularly in foundational systems like national farmer registries and digital identity systems, have the potential to attract co-investment from leading international financial institutions such as the World Bank, ADB and AfDB. Such initiatives also enhance efficient provision of agricultural services and reinforce IFAD's role as a key policy partner and a broker facilitating multi-stakeholder approaches to implementation.

B. Priority 2: Leveraging AI and data for enhanced extension advisory services.

32. Digital extension services offer a powerful opportunity to transform agriculture by delivering timely, relevant information on best practices, weather and climate adaptation directly to farmers. Scaling these services across IFAD projects can significantly enhance impact on productivity. By integrating emerging technologies, particularly AI and big data, IFAD can improve its targeting, efficiency and personalization of advisory services, thereby ensuring that smallholders, especially in remote areas, have access to actionable insights for informed decision-making.

[18] https://www.ifad.org/documents/d/new-ifad.org/smallholders-can-feed-the-world_e-pdf.

33. **Value proposition for IFAD.** Investing in AI and data-driven extension services within IFAD projects strengthens the Fund's positioning as a forward-looking leader in rural development. By leveraging AI innovation, IFAD enhances project design, improves targeting accuracy, manages climate risks more effectively and delivers tailored agricultural advisory services, while also advancing nutrition and gender-sensitive interventions. To fully harness this potential, IFAD must support Member States in building data ecosystems that drive sustainable, inclusive and resilient food systems.

C. Priority 3: Unlocking access to finance and enabling efficient market access for smallholder producers.

34. Digital solutions will have a limited impact on smallholder farmers unless they have access to finance and markets. Small-scale producers often struggle to obtain affordable credit, insurance and market access. Digital platforms can facilitate more opportunities to access these services, increase transparency, reduce information asymmetry and enhance the commercial viability of small-scale producers. Bundling finance and markets through digital tools can help reduce investment risks and attracts private sector participation. IFAD's role in facilitating these ecosystems helps ensure that digitalization enables rural producers to move from subsistence farming to commercially viable enterprises.

35. Digital tools such as mobile banking, e-wallets, blockchain and precision agriculture can enhance access to finance, improve market linkages and make it possible to offer tailored financial products such as insurance and credit. These technologies can also strengthen public-private-producer partnerships, fostering transparent, efficient and climate-resilient agricultural value chains. Digital platforms can reduce transaction costs, improve price transparency and empower farmers to participate more equitably in markets.

36. **Value proposition for IFAD.** ICT4D-driven market and financial linkages directly address structural barriers that smallholder producers face, which include limited access to buyers, lack of fair pricing mechanisms and exclusion from formal financial systems. By embedding digital solutions into its operations, IFAD amplifies the commercial viability of smallholder agriculture, positioning rural producers to thrive in competitive, climate-smart and tech-enabled agricultural markets. This dual framing underscores the transformative impact for both IFAD and rural communities.

D. Operationalization at project level for impact and scale

37. Scaling up digitalization requires strong project management units with digital capacity, alignment with national strategies and robust knowledge-sharing. Setting clear targets and indicators for digital interventions enables tracking and continuous improvement. Adopting a value chain digitalization approach at project design, supported by interoperable data systems and local partnerships, can ensure impact and sustainability.

38. **Approach to partnerships and resourcing.** IFAD will continue to leverage a network of partnerships, including with governments, United Nations agencies, private sector entities, development partners and farmers' organizations. Examples of such partnerships include the Mobilizing Access to the Digital Economy Alliance: Africa, with AfDB, the World Bank and the Mastercard Foundation; the Leveraging Satellite-based Digital Solutions for Climate-Resilient Agriculture Project in the United Republic of Tanzania, with the China International Development Cooperation Agency; the Agricultural Large Language Model (AgriLLM), an AI agricultural advisory platform based on a large language model, with the Government of the United Arab Emirates, CGIAR, FAO, the Gates Foundation, the Technology Innovation Institute and the World Bank; the Smallholder Economic Empowerment through Digital Solutions initiative, with the Ministry of Agriculture, Food and Rural Affairs of the Republic of Korea; and the Data for Digital Agricultural Transformation

Joint Programme launched by the Government the United Republic of Tanzania, the United Nations SDG Fund and the European Union.[19] These partnerships facilitate technology co-creation, resource mobilization and knowledge-sharing.

39. Under its **programme of loans and grants (PoLG),** IFAD investment projects will prioritize farmer registries as a key source of foundational data needed to deliver digital services to enhance access to extension services and promote market access and financial inclusion through mobile wallets. Projects will also seek opportunities to adapt AI-enabled advisory platforms leveraging climate data to deliver advisory services in local languages to support better adoption. The PoLG will also support linking of remittances to microloans for agricultural technologies and bundling of remittance services with other digital tools. These solutions will be integrated across programmes on production, climate resilience, natural resources, livestock and value chains.

40. Complementing the PoLG, **supplementary financing** will be key to supporting piloting initiatives that focus on climate-smart technologies, digital financial inclusion and agritech scale up. These pilots will be anchored in, for example, agritech and fintech accelerator programmes, innovation challenges for blockchain traceability and digital remittances for credit scoring. IFAD's regular grants programme will support initiatives that focus on institutional capacity-building, technical assistance and the development of DPI, including farmer registries and e-payment systems, and policy engagement in Member States.

E. Questions for discussion

- Do the proposed three strategic focal areas align with IFAD's comparative advantage as a promoter, advocate and financier in the digital agriculture space?
- Are there additional areas where IFAD should focus to strengthen rural transformation?
- What lessons and experiences would Member States like to bring to IFAD's attention to optimize the impact of rural digitalization?
- How can IFAD and Member States best support the development of effective legal and regulatory frameworks, such as data privacy laws, to support scaling up of private sector digital solutions in rural areas?

[19] https://www.jointsdgfund.org/article/data-agriculture-planting-digital-solutions-drive-transformation.

Overview of ICT4D and digital agriculture in IFAD projects

1. This annex provides further information on ICT4D/digital agriculture in IFAD projects and initiatives. The information comes from the global digital tracker for ICT4D initiatives.

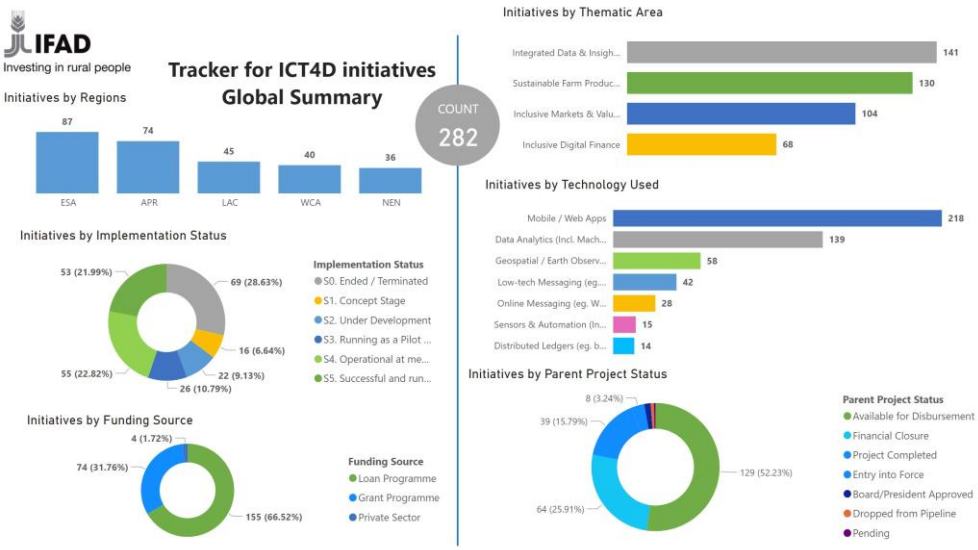
2. ICT4D/digital agriculture refers to the use of information and communications technology (ICT) to enhance agricultural development and improve the livelihoods of rural communities. This includes the use of tools such as mobile phones, radio, satellite imagery, geographic information systems, data platforms and internet-based services to support smallholder farmers and other agricultural actors. ICT4D enables timely access to critical information – such as weather forecasts, market prices, pest alerts and agronomic advice – while also facilitating financial inclusion, supply chain efficiency and policy planning. In agriculture, ICT4D plays a key role in improving productivity, resilience and connectivity across the value chain, especially in remote and low-resource settings.

Digital transformation in agriculture

3. Digital transformation goes beyond the mere adoption of digital tools; it involves a fundamental shift in how agricultural systems are designed, operated and governed through the strategic integration of digital technologies. In agriculture, this means rethinking service delivery models, improving the efficiency of resource use, enabling data-driven decision-making, and fostering more inclusive, resilient and responsive systems. Digital transformation entails institutional change, capacity development and policy reforms that align technology with broader goals such as climate adaptation, food security, gender equity and resilience of rural livelihoods. It transforms not only farm practices but also the entire ecosystem, including agribusinesses, input providers, financial institutions and public agencies.

4. The IFAD ICT4D tracker shows a total of 282 initiatives integrating digital solutions since IFAD6. Of these initiatives, 70 per cent are active, as indicated in figure 1 below. The technologies that are most frequently integrated into projects are mobile applications and data analytics. Geospatial technology has been integrated into 58 initiatives, followed by online and offline messaging into 28 of the initiatives while Blockchain and sensors have been used in 5 per cent of interventions.

Figure 1
IFAD projects incorporating digital technology since IFAD6



Note: The figure is provided in English only as it is a screenshot of the IFAD ICT4D Tracker, which is available in English only.

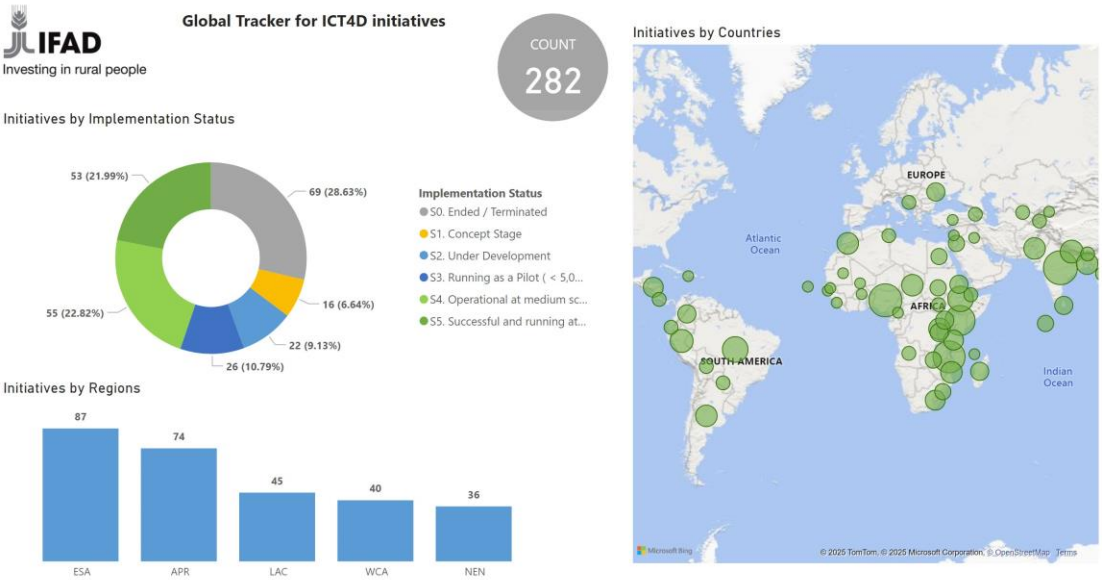
5. **Figure 2** shows that most of the digitally enabled projects are financed by investments. Grants and supplementary financing have also been a valuable source of support for digital innovation, having supported IFAD in designing, developing and piloting digital solutions linked to the PoLG.

Figure 2
Digitally enabled projects by funding source and region

Note: The figure is provided in English only as it is a screenshot of the IFAD ICT4D Tracker, which is available in English only.

6. **Figure 3** shows that most of the digital agriculture solutions integrated into projects are still active. In 29 per cent of cases, the digital solutions were part of projects that have closed and these solutions are no longer in use. The reasons that account for this situation include unsustainable business models and lack of clear exit strategies. However, 25 per cent of solutions are still operational at medium scale (5,000–50,000 repeat users) and 21 per cent are operational on a larger scale. This indicates that these solutions are still being used by the end beneficiaries and have been integrated into the ecosystem.

Figure 3
Status of digital solutions initiatives under IFAD-financed projects



Note: The figure is provided in English only as it is a screenshot of the IFAD ICT4D Tracker, which is available in English only.

7. **Figure 4** indicates that data analysis and decision-making are the predominant thematic areas with the highest number of associated solutions. This is particularly significant, as it underscores the urgent need to digitalize and enhance extension services and bolster farmers' capacities for resilience. The next most frequent thematic areas identified include access to markets and digital finance. The application of digital solutions is crucial not only during the implementation of digitally enabled projects but also during the design phase of such projects.

Figure 4
Digital solutions initiatives by technology used

Note: The figure is provided in English only as it is a screenshot of the IFAD ICT4D Tracker, which is available in English only.

8. Regarding the type of technology used, mobile apps and data analytics applications account for 60 per cent. The use of sensors has been limited, which might reflect the challenge posed by extra costs for the hardware required and lack of capacity to manage the technology. Geospatial technology is gaining attention and is being used to address relevant current issues such as deforestation and compliance with regulations such as the European Union Deforestation Regulation. Such technology is also being used to monitor investments.

Summary of findings from IFAD's 2023–2024 ICT4D stocktake

Figure 1
Key challenges from current IFAD-financed projects

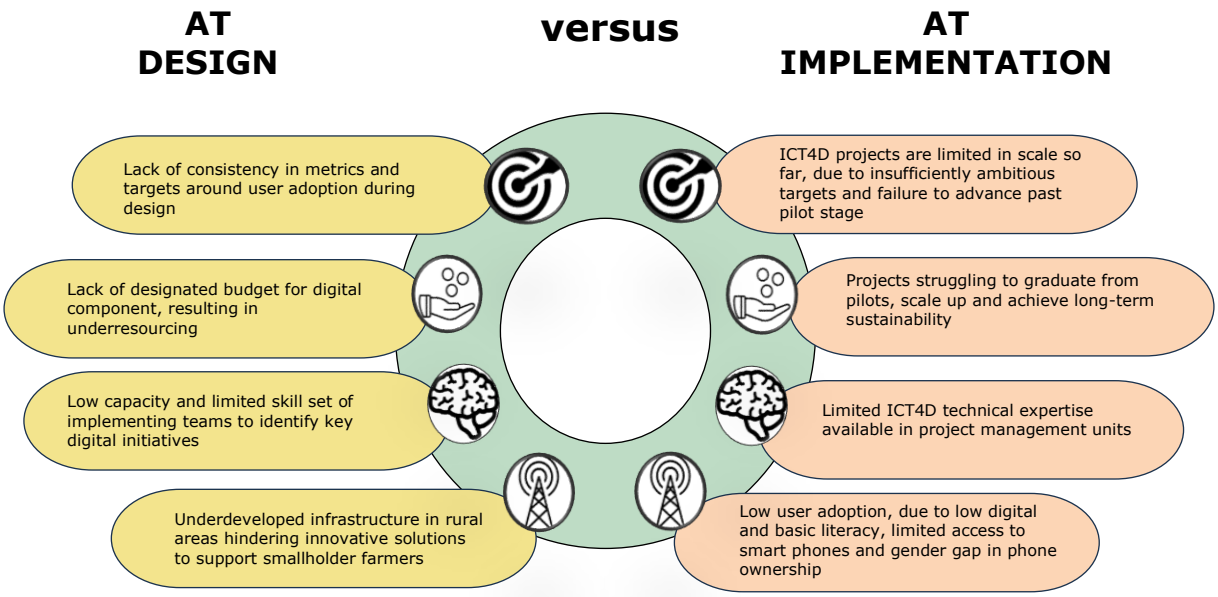


Figure 2
Actions being implemented to address the challenges

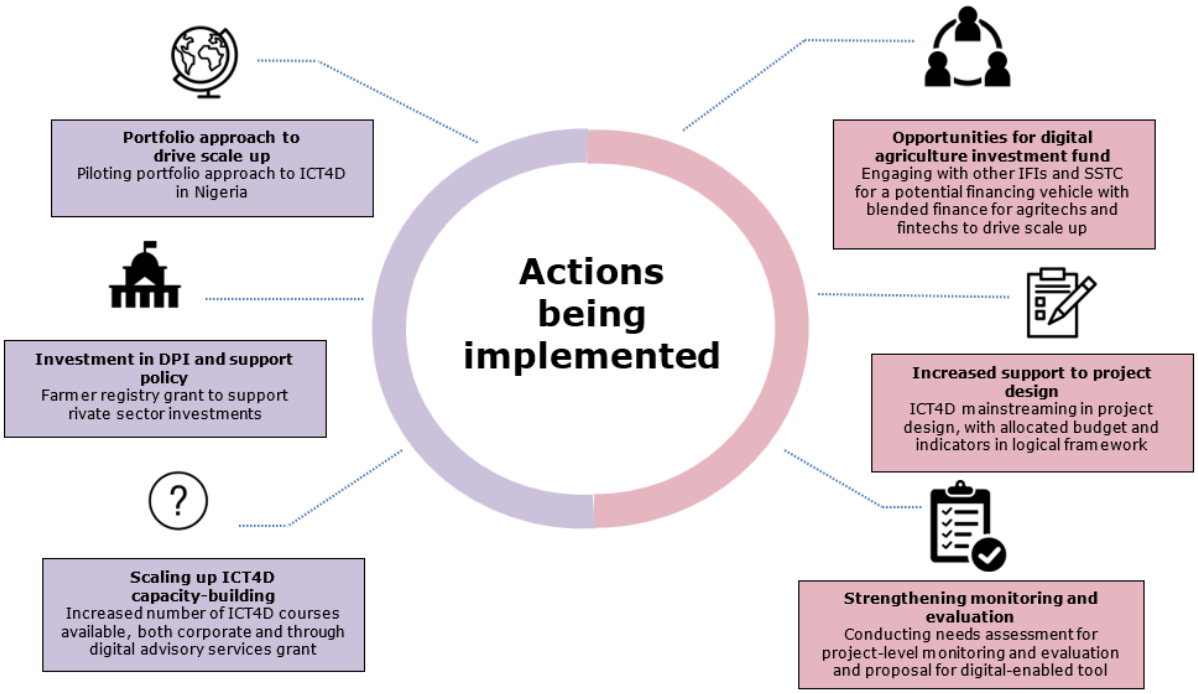
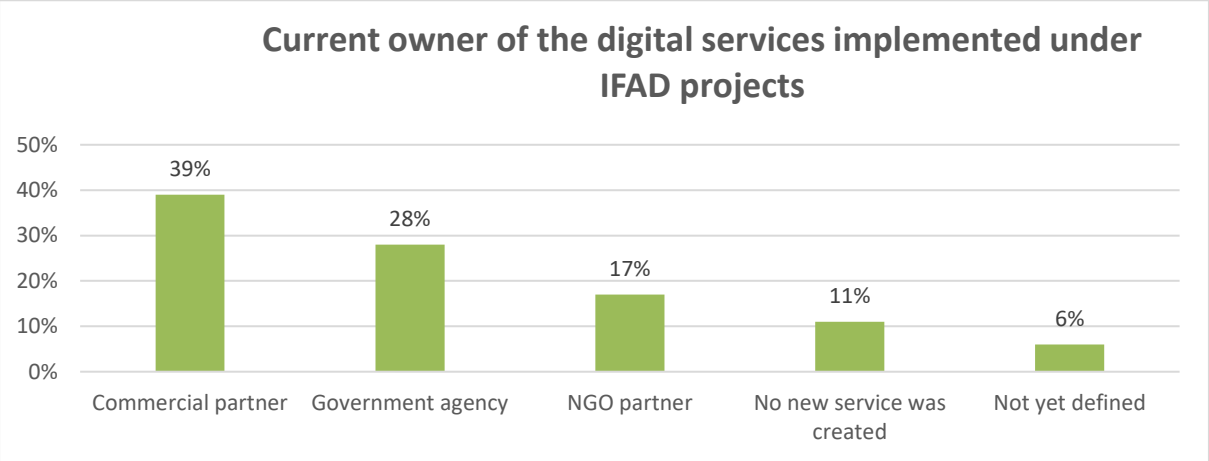


Figure 3
Approaches to service ownership in IFAD projects to promote scaling up



Note: Handing over services to private sector partners is the most popular solution to long-term ownership. Government ownership of a digital service/platform is the second most popular choice when it comes to long-term strategies for digital solutions.

IFAD partners in digital agriculture initiatives

Category	*Role*	*Examples*
Government institutions	Support smallholder farmers through improved agricultural practices and strengthening value chains for enhanced access to digital services	Ministry of Agriculture Ministry of Fisheries Ministry of Livestock Ministry of Environment Ministry of ICT
Private sector	Develop and offer tailored digital solutions and digital platforms for agriculture	Technology providers Mobile network operators Agritechs and fintechs
Financial institutions	Facilitate increased access to digital financial services, credit and savings, loans to support farmers	Banks Savings and credit cooperatives Financial services providers
Development partners	Provide funding, technical assistance and share best practices in relation to digital solutions and digital technologies for agriculture	World Bank African Development Bank Islamic Development Bank Asian Development Bank OPEC Fund Agence Française de Développement
Implementation partners	Support the implementation, adoption and scaling up of digital agriculture solutions	FAO World Food Programme CGIAR
Intergovernmental/regional organizations	Create an enabling environment for digital agriculture, facilitate collaboration and knowledge-sharing, advocate and promote the adoption of digital solutions for agriculture	European Union African Union
Regional farmers' organizations	Identify the priority needs of farmers and support the use and adoption of digital solutions for agriculture.	Asian farmers' associations African farmers' organizations Latin American farmers' organizations

Examples of IFAD digitalization-related project interventions

1. **Kenya Cereal Enhancement Programme – Climate-Resilient Agricultural Livelihoods Window (KCEP-CRAL).** Kenya is supporting the training of 100,000 smallholder farmers in financial literacy and enhancing their access to input subsidies through an electronic voucher scheme. To date, a cumulative total of 148,551 smallholder farmers have accessed various agricultural inputs through the e-voucher scheme (69,042 adult women, 48,073 adult men, 19,619 young women and 11,817 young men against the overall appraisal target of 140,000). The total value of the inputs accessed to date is estimated at 3,222,916,520 Kenyan shillings (approximately US$22 million). Through the programme, other services have been integrated into the e-voucher scheme, such as migration to a cardless system, integration of financial and insurance services and use of mobile-based services. The bundled input and insurance support is being scaled up by AFEX Fair Trade, working directly with farmers supported by KCEP-CRAL. This arrangement has enabled farmers who have graduated from the e-voucher scheme and others from outside the programme to benefit from continued access to inputs and markets.

2. **Rural Finance Expansion Programme, Zambia.** The programme has promoted the use of digital financial services among rural poor men and women and has effectively reached 643,449 people (129 per cent of the end target, with women making up 57 per cent of the beneficiaries). It has enabled access to a range of 27 innovative digital financial services and inclusive financial products across the country. Access to digital platforms also alerts users to market and business opportunities. Evidence indicates that smallholder farmers can enhance their income by 18 per cent on average through digital financial services, and their productivity often increases by 25 to 50 per cent as a result of digitally enabled payments and support for access to financing and other financial services (from both banks and microfinance institutions).

3. Through the **Tejaswini Rural Women's Empowerment Programme in Maharashtra, India**, IFAD has supported the development of an e-business portal at the Maharashtra Women's Development Corporation (MAVIM), the main implementing partner for the programme, to promote women's access to digitally enabled marketing and enable them to engage with buyers. The e-business portal has empowered more than 200,000 women entrepreneurs and farmers to promote and sell their products to a wider audience, as well as to expand their trade prospects and access financial services. IFAD also supported the development of software for the digitalization of self-help group (SHG) accounts and transactions. About 80,000 SHG accounts and transactions have been digitalized, contributing to the creation of a digital credit history for the groups. Overall, these SHGs have mobilized US$200 million from public and private sector banks. MAVIM has also enabled 4,853 women to access loans amounting to US$1.81 million.

4. **Agriculture Services Programme for an Inclusive Rural Economy and Agricultural Trade, Cambodia.** The programme has supported the development and roll-out of the Chamka app in 20 provinces of the country. The app provides digital advisory and input supply services to smallholder farmers for four value chains (chicken, rice, vegetables and fish/aquaculture). More than 50,000 farmers and 40 input suppliers are currently using the app. Community extension workers have been trained to support farmers in using the app and are being incentivized to engage with farmers to use the advisory services. This app is now sustainable thanks to the input supply transactions generated on the platform, and the lessons learned in this programme are being applied in the Sustainable Assets for Agriculture Markets, Business and Trade Project.

5. **Rural Economic Growth and Employment Project, Jordan.** The project is providing grants to enable small-scale farmers to invest in their own farming activities. To maintain timely delivery of grants despite the COVID-19 pandemic lockdown, the project began transferring funds to participants via e-wallet applications. The e-wallets have been set up in collaboration with the Jordan Payments and Clearing Company. JoPACC is also working with several other electronic payment systems that are integrated with banks in Jordan, including JoMoPay. This has been critical to the small and microloan services and related financial services provided to small-scale farmers. The e-wallet scheme helped to minimize social interaction during the pandemic and facilitate the beneficiaries' access to grants. Dedicated capacity-building has been offered (especially to the less tech-savvy beneficiaries) to enhance their understanding of this modern technology. As of 2021, 2,183 beneficiaries had accessed grants through the e-wallet scheme, 60 per cent of them women and more than 20 per cent youth.

6. **Livelihood Improvement Family Enterprises Project in the Niger Delta of Nigeria (LIFE-ND).** IFAD has partnered with Digital Green through the LIFE-ND project in Nigeria for the use of FarmerChat, an AI-enabled digital assistant for field extension agents to provide AI-enabled and tailored advisory services to smallholders in local languages. The technology leverages large language models and natural language processing to support inclusivity and ensure relevance to farmers' unique needs. Lessons learned and best practices from the use of FarmerChat will support scaling up to other projects across the portfolio and to more countries.

7. **Promoting Agricultural Commercialization and Enterprises Project (PACE), Bangladesh.** PACE has supported 300,000 microenterprises, including 150,000 women-owned businesses, helping them expand their operations through access to credit and technical support. As a result, their combined sales have increased by 50 per cent. PACE has also facilitated market access by connecting farmers with online retailers, enabling them to sell high-value crops more efficiently and at competitive prices.

8. **Innovatech Project.** The IFAD Innovatech Project, which concluded in December 2023, supported agritech start-ups in the Plurinational State of Bolivia, El Salvador, Guatemala, Haiti, Honduras and Mexico by providing tailored technical assistance. In Guatemala, the start-up facilitated the distribution of payment points across the country, making it easier for smallholder producers to apply for microloans and access financial services.