IFAD
Investing in rural people

Digital Agriculture in Asia and the Pacific Region
A synthesis of ongoing work

Introduction

While the use of information and communication technologies (ICTs) and digital tools has been increasing steadily across large swathes of rural Asia during the past two decades, the ongoing COVID-19 crisis has imparted a sense of urgency in terms of accelerating this trend.

The initial disruptions caused by the restrictions governments in the region had to impose to slow the spread of the pandemic to Asia's food value chains created widespread alarm. The fragility of current food systems when confronted with large-scale shocks was abruptly exposed. Overall, governments in the region should be recognized for reacting promptly and taking measures that ultimately allowed food markets to avoid major disruptions. Food prices have remained generally stable in spite of localized failures in logistics and increases in transportation costs. Member states of the Association of Southeast Asian Nations (ASEAN), committed as early as April 2020 to avoiding disruptive trade measures that would impact international food prices, in much the same way as they had done during the 2008 food price crisis. Although a repetition of the 2008 and 2011 food price crises has been averted, the urgency of investing in the resilience of Asian value chains to manage future systemic shocks has nonetheless become clear. Investments in ICTs and digital tools are seen as critical to this strategic priority. For instance, the ASEAN Comprehensive Recovery Framework, approved in November 2020, lists increased coverage of ICTs in rural areas and guidelines for the use of digital technologies in the agriculture and food sector among its key priorities.

Against this background, interest in the potential for digital agriculture as an enabler or accelerator of agricultural development extends to IFAD itself, and the Fund's support in accelerating the use of ICTs and digital tools among smallholders in rural and remote areas is quickly building up. In December 2019, IFAD's Executive Board approved its first Information and Communication Technology for Development (ICT4D) Strategy 2020-2030.

An initial four-year action plan covering 2021-2024 has also been developed and approved to operationalize the ICT4D strategy under the stewardship of the Sustainable Production, Markets and Institutions Division (PMI). Within that context, IFAD's Asia and the Pacific Division created a regionally specific strategy and action plan that align with IFAD corporate efforts and meet the more precise needs of IFAD countries in the region of Asia and the Pacific.

KEY PARTNERS
Ministry of Agriculture, Food and Rural Affairs (MAFRA) of the Republic of Korea, Grow Asia, Food and Agriculture Organization (FAO), Precision Agriculture for Development (PAD).

THEORY OF CHANGE

The vision of IFAD's ICT4D strategy[1] is to create rural societies in which people have inclusive access to ICT-enabled services and solutions to achieve food security and prosperity that leaves no one behind by 2030. The strategy focuses on four key action areas aimed at leveraging ICT to increase development impact and improve the economic and social conditions of rural people through increased agricultural productivity, greater benefits from market participation and strengthened household resilience. The four areas are: (i) scalable uptake of ICT4D solutions; (ii) strengthening ICT4D partnerships; (iii) enhancing ICT4D knowledge management and sharing; and (iv) building internal ICT4D awareness, capacity and leadership.

Within this context, IFAD's Asia and the Pacific Division (APR) aims at meeting more precise needs of IFAD countries in this, with the ambition of being seen as the one of the go-to institutions because of its strong track record in demonstrating effective models for enabling sustainable and impactful ICT4D solutions for smallholder agriculture and small-scale artisanal fisheries. This objective will be achieved over the coming years through the engagement of selected partners who can support increased use of human-centred design, such as: (i) local think tanks, research institutes and academia to enable enhanced data analysis and assessments enabled by digital data collected by IFAD projects, (ii) multilateral networks aligned with APR's priority thematic areas, including farmer organizations (FOs)/associations/networks and technology solution providers, and (iii) regionally focused agtech and fintech challenges and accelerators.

IFAD strategy focuses on four key action areas aimed at leveraging ICT to increase development impact and improve the economic and social conditions of rural people through increased agricultural productivity, greater benefits from market participation and strengthened household resilience.

ICTs AND DIGITAL SOLUTIONS IN APR PORTFOLIO OF LOANS AND GRANTS

A cataloguing of ICT4D solutions[2] jointly undertaken by APR and PMI in 2020 found a total of 50 solutions across 14 different countries[3] in Asia and the Pacific (Graph 1). The catalogue remains a living document, where relevant advancements will continue to be recorded.
As of the end of 2020, 52 per cent of the solutions identified are in South Asia.

Graph 1 **Number of ICT4D solutions per country**
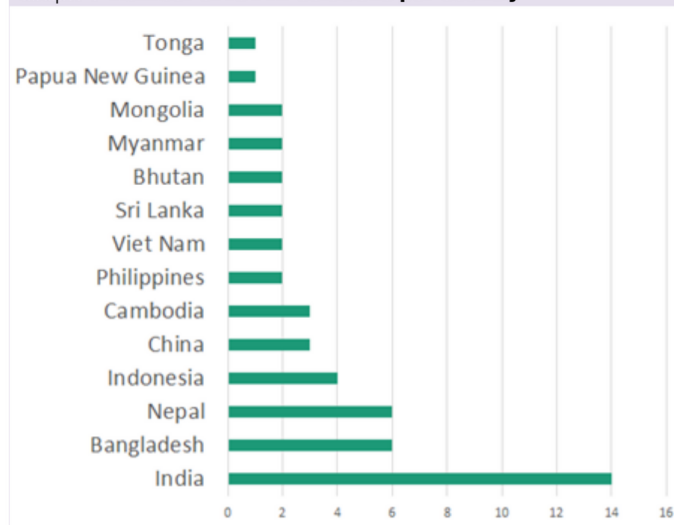
Most solutions are funded through loan programmes (68 per cent), while the remaining are funded through grants or supplementary funding.
With respect to the main focus areas listed under the IFAD ICT4D strategy, most of the APR initiatives are aimed at improving access to information (49.4 per cent), followed by access to services (29.1 per cent). Financial inclusion is the focus of only 6.3 per cent of the initiatives funded under APR's programme of loans and grants (Graph 2)

Graph 2 **Focus areas in IFAD's ICT4D strategy (per cent)**

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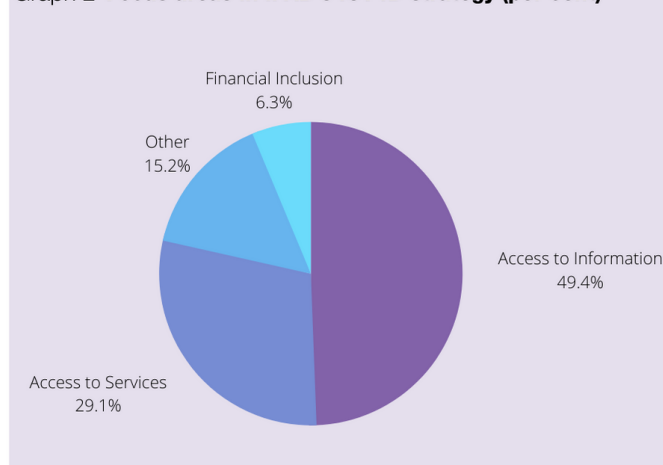
[1] EB 2019/128/R.5

[2] A digital solution is a term used to describe a solution that incorporates the use of digital technology to solve a problem.

[3] These countries include Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Mongolia, Myanmar, Nepal, Papua New Guinea, Philippines, Sri Lanka, Tonga and Viet Nam, as of December 2020.
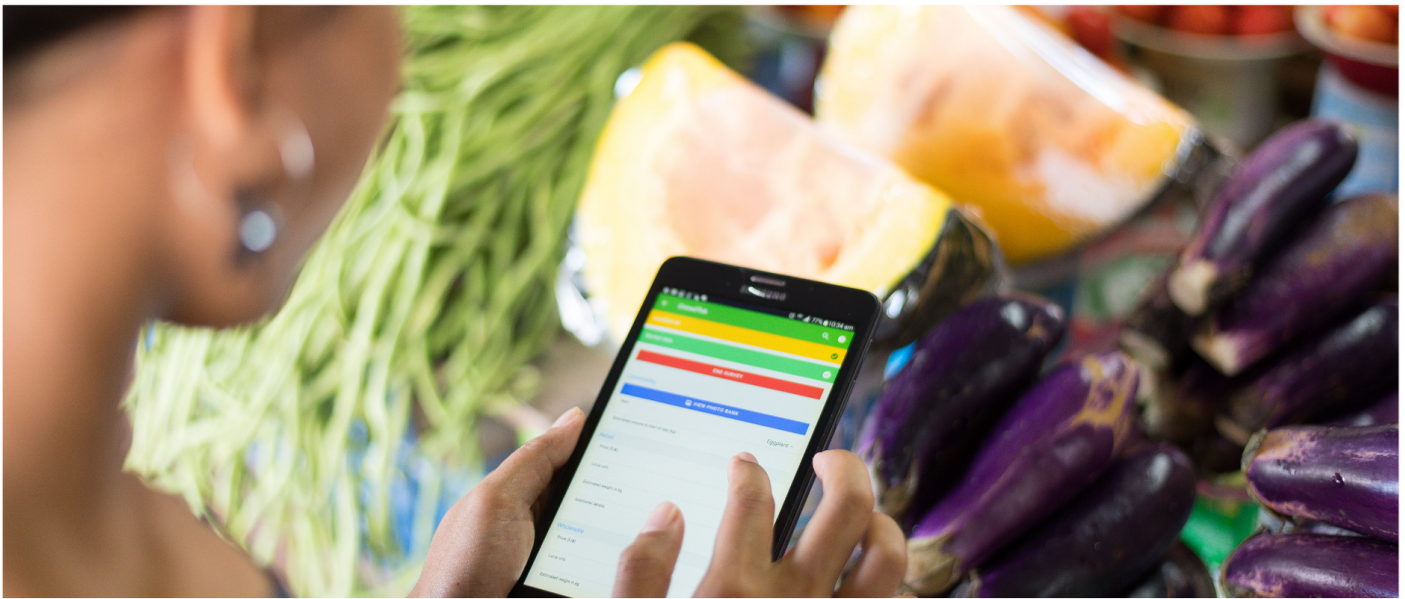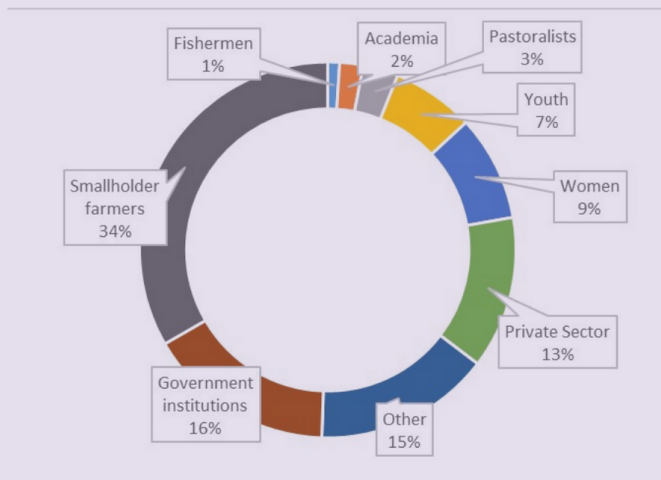
As to be expected given IFAD's mandate, most of the solutions (53 per cent) directly target smallholder farmers, pastoralists, youth, etc. (Graph 3). The focus on building capacity to use digital technology in programming and operations is also noticeable, with 19.2 per cent of the interventions targeting government institutions. Less satisfactory is the limited focus on gender. The latter is a theme that will need increased focus in the coming years, particularly in view of the fact that women have been disproportionately impacted by the COVID-19 crisis and their circumstances have suffered significantly compared with before the pandemic.

Graph 3 **Target users of ICT4D solutions (per cent)**

- Fishermen 1%
- Academia 2%
- Pastoralists 3%
- Youth 7%
- Women 9%
- Private Sector 13%
- Other 15%
- Government institutions 16%
- Smallholder farmers 34%

The catalogue identifies different types of technologies used in ICT4D solutions, from mobile apps to geospatial technologies, decision support systems, automated milking/feeding, drones, and more. However, mobile apps, decision support systems and geospatial technologies are those most represented in the APR portfolio and the most advanced in terms of implementation, as illustrated by the examples illustrated below

Scaling up the integration of GIS in IFAD operations

IFAD's commitment under IFAD12 is for 80 per cent of new IFAD projects to have geo-referenced monitoring and evaluation (M&E) datasets on buildings, roads, irrigation schemes and institutions stored in global corporate monitoring tools. Integrating the use of geographical information systems (GIS) into corporate and project M&E systems contributes to IFAD's ICT4D strategy and has the potential to enhance IFAD's transparency and accountability, as well as communication and visibility, thus potentially attracting more funding and ultimately contributing to the Sustainable Development Goals by benefiting IFAD's target groups. Mapping of investments generates value at the project level by helping to better monitoring project activities and by informing decision-making for greater project impact. Mapping of interventions and results will be increasingly critical in a post COVID-19 context for both service delivery and M&E.

IFAD interventions in Cambodia serve as an example of how digital technologies and GIS can boost agribusinesses. IFAD's programmatic approach in Cambodia is supporting rural and agricultural development in target provinces with the highest rate of poverty by capitalizing on ICT4D technologies in its projects. Through its country programme, IFAD is partnering with government ministries in Cambodia to develop scaled up, modernized interventions that will support a more comprehensive and strategic planning of value chains, while also addressing the impacts of COVID-19. The leveraging of GIS technology to capture information on the outputs of projects in Cambodia, will form the basis of a country programme dashboard and a GIS system. The following three cases illustrate the innovative potential of IFAD's programme in Cambodia.

AGRICULTURAL SERVICES PROGRAMME FOR INNOVATION, RESILIENCE AND EXTENSION (ASPIRE)

The objective of the programme is that, by end 2021, an improved model of extension services for Cambodia will be helping smallholder farmers to contribute to broad-based economic growth. The project is geographically mapping all the 1,000 business clusters supported by ASPIRE and using GIS-based climate vulnerability maps to identify hotspots that can help to strategically plan resources. GIS maps are also used as part of the programme's targeting strategy in order to identify and reach poor women and indigenous producers and provide services (Figure 1).
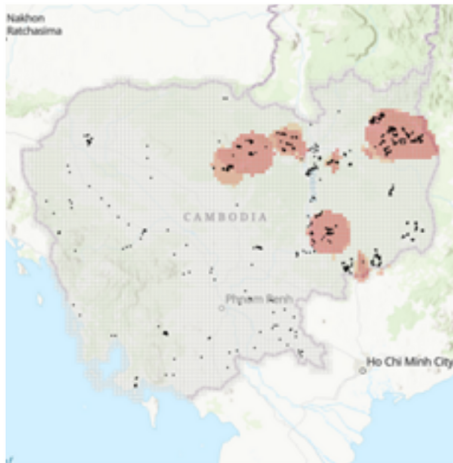

Figure 1   **Poor, women and indigenous producers mapped in ASPIRE**

ACCELERATING INCLUSIVE MARKETS FOR SMALLHOLDERS (AIMS)

As part of a new generation of IFAD-supported projects dealing with inclusive market development in Cambodia, the objective of AIMS is to enhance the prosperity of Cambodian smallholder farmers through increasingly profitable links to agribusinesses and markets. Applications and software introduced by the project include Facebook, WhatsApp, Agribuddy, GIS and SIMES. Clustering groups of producers that grow the same commodity helps the project to identify and plan for the type of services needed. Some 75,000 households are expected to benefit directly from the project with an increase in household assets of at least 25 per cent. An operational M&E system using data captured by a management information system is being developed.

SUSTAINABLE ASSETS FOR AGRICULTURAL MARKETS, BUSINESS AND TRADE (SAAMBAT)

The SAAMBAT project is coordinated with AIMS and ASPIRE and aims to reduce poverty and enhance food security in Cambodia by sustainably increasing the productivity of youth, enterprises and the rural economy, while also addressing the challenges posed by climate change. Component 1 of SAAMBAT finances value chain infrastructure in "economic poles", which are target areas of AIMS and ASPIRE. Component 2 finances linked interventions for skills and entrepreneurship training for rural youth and for the development and roll-out of a digital ecosystem for smallholder agriculture (see below).

In SAAMBAT, physical project outputs (component 1) and training outputs (component 2) will be recorded using GIS technology and combined with data from AIMS and ASPIRE to generate maps of the economic poles and charts to illustrate:

- Locations of SAAMBAT economic poles and outputs
- Number, location and type of beneficiaries
- Characteristics of economic poles
- Outcome indicators by economic pole.

Photo: IFAD, 2014

Building a digital ecosystem

A digital ecosystem comprises the stakeholders, systems and enabling environments that together empower people and communities to use digital technology to gain access to services, engage with each other or pursue economic opportunities. This section focuses on a series of digital agriculture solutions tested by different projects in the Asia and the Pacific region that illustrate the efforts and benefits of digital solutions aimed at enhancing specific digital ecosystems. The solutions identified cover a series of categories: access to services and markets, access to information, and financial inclusion.

Access to services and markets

THE CASE OF BANGLADESH

Under the Promoting Agricultural Commercialization and Enterprises Project (PACE), an online marketing platform was introduced in 2018 to support microentrepreneurs to enhance their visibility and promote their products. By building on an existing platform, and with the support of supplementary funds from the Republic of Korea, the project launched an integrated solution with three different components:

An e-commerce service named "Suponno" (meaning "quality products") through which rural microentrepreneurs can access e-commerce services, virtual marketplaces and online payment management gateways, and assign product delivery to courier services using the same online platform

An e-knowledge window with knowledge management products and training tools for farmers and entrepreneurs An integrated results-based monitoring system of value chains and technology transfer activities using electronic devices such as android mobile phones and tablets.
In 2020, more than 380 products of 19 different business groups were uploaded to the platform, which resulted in increased sales. In collaboration with other e-commerce services from the public and private sector, the project is further assessing opportunities to strengthen linkages between microentrepreneurs and customers in Bangladesh.

THE CASE OF CAMBODIA

The ICT Services for Smallholder Value Chains in Cambodia Project (Chamka) is implemented as an integral part of the overall ASPIRE programme activities. Funded through a grant by the Republic of Korea, the project aims to enhance the profitability and resilience of the farm businesses of Cambodian smallholder farmers through the adoption of ICT applications for networking, information exchange and produce marketing. Chamka is designed to become a self-sustaining commercial application.

Chamka focuses on three value chains (rice, vegetables and backyard chicken) and combines virtually (i) a weather warning system; (ii) regular updates of extension-relevant news; (iii) a dedicated library of technical documentation, including COVID-19, gender and climate change education material; and (iv) the opportunity to participate in one-on-one sessions with a technical expert. The access to simple informative technical videos in the local language is already proving highly popular with farmers. The virtual platform is used mainly for purchase of inputs but, in time, it will allow producers to link with buyers, make contracts for type, quantity, quality, price and time and delivery or collection and ultimately to facilitate digital payments.

The functionality of Chamka is being expanded in response to the COVID-19 pandemic (see below) and, with a farmer diary module, will allow farmer-friendly recording of activities, inputs, outputs and sales with simple analytical tools.

Over 6,150 farmers are registered through the Chamka app, almost 30 per cent of whom are women. The app also demonstrates high interest among youth farmers, with around 2,500 of those registered being between the ages of 17-29 years of age.

At the same time, the SAAMBAT project is supporting a more ambitious long-term initiative to develop an integrated digital ecosystem for smallholder agriculture. Named the "Khmer Agriculture Suite", this will be a platform with core functions and a suite of associated applications. SAAMBAT supports the Techo Start-Up Centre of the Royal University of Phnom Penh to develop the core platform and five priority commercial products based on models of digital applications for smallholder agriculture that have proved successful elsewhere. SAAMBAT will support a challenge fund to encourage entrepreneurs to develop additional Khmer Agriculture Suite applications. SAAMBAT will also support a complementary initiative to develop digital literacy and awareness of the possibilities of digital technology for smallholder farmers, working through the business clusters established by ASPIRE and AIMS.

THE CASE OF THE PHILIPPINES

An online directory of and guide for geographic indication (GI) systems for three different value chains was established in the Philippines under the grant Enhancing Results-based Monitoring and Evaluation through Innovative ICT Solutions: Linking Upland Farmers to Market and Improving Municipal Waters Governance, implemented in collaboration with the Food and Agriculture Organization of the United Nations and funded by supplementary funds provided by the Republic of Korea. The core objective of the project is to develop innovative and replicable solutions for effective monitoring and reporting of results of rural transformation initiatives through the application of ICTs. More specifically, the grant project will be interfacing with selected IFAD-assisted loan projects. The Rural Agro-enterprise Partnership for Inclusive Development and Growth RAPID project, under the Department of Trade and Industry, and the Cordillera Highland Agricultural Resource Management (CHARM) Project, under the Department of Agricutlure, work with farming communities, cooperatives and micro, small and medium-sized enterprises to address rural poverty and unemployment. The ICT tools developed within the project sites n the Davao and Cordillera regions aim to introduce GI systems to support the cacao and coffee farming cooperatives of both projects. The FishCORAL project – under the Bureau of Fisheries and Aquatic Resources – supports small-scale fishing communities through livelihood improvements. A component of this project will be the deployment of unmanned aerial vehicles for combating illegal, unreported and unregulated fishing to promote sustainable coastal resource management.

THE CASE OF VIETNAM

A market linkage platform for the One Commune One Product programme is being developed under a grant funded by supplementary unds from the Republic of Korea. The platform is envisioned as an interactive, user-friendly website interface that provides information on: (i) market price analysis and forecasts; (ii) agriculture production or potential suppliers, including farmer's groups, cooperatives and small/medium/large production enterprises; and (iii) agriculture demand related to processing and trading. The web portal and mobile application is under construction and will form an online network for sharing and forecasting market prices and information on production and business opportunities among different stakeholders (producers, cooperatives, traders and enterprises, and service providers) in order to promote trading linkages in specific value chains.

THE CASE OF CHINA

A Quality and Safety Traceability System was developed for Zhenba Bacon under the Sustaining Poverty Reduction through Agribusiness Development in South Shaanxi (SPRAD-SS) project to support small hog producers in capturing business opportunities, expanding their market outreach potential and increasing productivity.

The solution involved developing a digitalized traceability system, setting food quality standards and facilitating access to markets, in addition to training and capacity building activities addressed to all stakeholders across the value chain. ICTs, such as data management platforms, the internet of things in agriculture and animal identification management systems, were incorporated in the traceability system. [4] As a result, every package of Zhenba bacon has an ID card, and consumers can identify the source and trace the processing of the bacon they buy. Through the data service platform and the pig industry chain quality and safety traceability platform, pig breeding, raw material procurement, production and processing, packaging, labelling and sales have been strictly regulated and standardized. All this has moved the Zhenba bacon industry into more sustainable, reliable and value added livestock production.

Access to information

THE CASE OF INDONESIA

An online platform dedicated to rural youth is planned in the context of the Youth Entrepreneurship and Employment Support Services Programme, which aims to support the integration of youth into the rural economy. The online platform will take the form of both a website and two mobile applications (one with the features of the website version and the other for e-learning features), which will provide information about opportunities for youth in the rural economy, as well as e-learning for young people. The platform will use digital marketing approaches to engage with young people and with other players interested in participating in the promotion of youth employment and entrepreneurship. In particular, the platform will: (i) inform young people about news and opportunities in the agriculture-based sector; (ii) provide information on Youth Entrepreneurship and Employment Support Services Programme objectives, activities and achievements; (iii) facilitate young agripreneurs in learning essential agrifood and agribusiness development through an e-learning course; (iv) help young agripreneurs connect with their peers to resolve business-related issues and identify opportunities for partnerships; (v) provide financial literacy advice and hands-on tools to build youth financial capabilities to engage into agriculture-based activities.

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[4] Read more: https://www.ifad.org/en/web/latest/story/asset/42450292

THE CASE OF NEPAL

The Farmer's Diary is a documentation tool used by smallholder farmers in two ongoing investments in Nepal: (i) the Agriculture Sector Development Programme (ASDP) and (ii) the Rural Enterprises and Remittances Project. The diary helps farmers to record data on their on-farm activities related to production, sales, marketing and income from value chain commodities of individual farming households. Expenditures made on different headings, saving and credit, business plan and technology used in farming are also part of the diary. The information collected through the tool is incorporated into an information management system, which provides the farmers with an overview of their business activities, allows assessment and facilitates planning. The Farmer's Diary also allows the project implementers to assess impact and outreach, enhance adaptive management and formulate programmatic plans and policies. By 2020, the Farmer's Diary had been introduced to over 10,398 smallholders.

THE CASE OF CHINA

In the context of the Yunnan Rural Revitalization Demonstration Project, and with a view to addressing climate adaptation, a series of ICT solutions are planned, along with targeted activities, all aiming to improve farmers' access to weather forecast information and advice on climate change adaptation options in their farming practices. The solutions include:

- installing weather and agrometeorology monitoring units
- establishing early warning systems for priority products in selected areas
- training producers in the use of climate data, identification of risks and application of appropriate coping strategies
- providing technical support to selected entities to establish climate-smart agricultural platforms.

THE CASE OF FIJI

As part of the of an IFAD/Technical Centre for Agricultural and Rural Cooperation (CTA)CTA/European Union-funded regional grant, Promoting Nutritious Food Systems in the Pacific or Innov4AgPacific, a regional competition was launched in 2018 to identify and assess the potential for scaling up novel or existing ICT4Ag innovations tor overcome challenges in Pacific agriculture, agribusiness and value chain development. The winners of the competition, Pacific Agrihack Lab, received a seed grant with mentorship and incubation included. MyKana app, one of the award winners, was born out of a collaboration between the University of the South Pacific and the National Food and Nutrition Centre of the Ministry of Health and Medical Services in Fiji. Its aim is to improve dietary diversity and nutrition and promote home gardens to grow healthy foods. The app's My Garden component includes information and step-by-step videos on planting,

cultivation and managing garden pests; container gardening for urban and peri-urban residents; techniques for food preservation; and recipes using local produce. The app, released in January 2020 and promoted vigorously on Facebook, began receiving hundreds of "likes", Then, as COVIC-19 lockdowns commenced and job losses increased, many Fijians turned to home gardening to save money and improve their food security. When the Fiji Ministry of Agriculture began promoting home gardening as a national response to the pandemic, MyKana complemented the scaling up of the response. In early 2021, there have been more than 5,000 downloads and over 200 gardens established thanks to the app.

Financial Inclusion
THE CASE OF INDIA

In order to facilitate access to financial services, the SHE software was developed under the aegis of the recently closed Tejaswini Rural Women's Empowerment Programme in the state of Maharashtra, India. Through the software, the Maharashtra Arthik Vikas Mahamandal (MAVIM), the Women's Development Corporation of the Government of Maharashtra, which is dedicated to women's development in the state and the lead implementing agency of the Tejaswini project, was able to monitor the physical and financial progress of the self help group (SHG) portfolio regularly. This included monitoring real-time information about SHG performance in terms of savings, credit, repayment, types of enterprises financed and compliance with performance standards, through a system of alerts built into the software. The software also generated SHG data that was shared with private commercial banks as the credit history of SHG members to facilitate the provision of loans to the SHGs. While the system was a simple database application, it continues to function even after the closure of Tejaswini and will be further developed into a robust microfinance software that can handle SHG and individual loans and real-time tracking of transactions, including mobile phone-based financial transactions under the new project in the state, called 'Nav Tejaswini'. Overall, the Tejaswini project mobilized 1 million women into 78,819 SHGs, leveraging almost US$250 million from banks with IFAD financing of US$26.65 million.

DIGITAL AGRICULTURE AND COVID-19 RESPONSE

The COVID-19 pandemic has highlighted weaknesses in supply chains across countries that require innovative approaches if they are to be successfully addressed. ICTs and digital tools are being seen to be relevantin responding to the challenges generated by COVID-19 and ensuring the resilience of smallholder farmers in the face of future shocks.

The World Economic Forum, Grow Asia and IFAD co-hosted the first ASEAN Regional Food Systems Roundtable to

The COVID-19 pandemic has highlighted weaknesses in e collaboratively and innovatively address the impact of the COVID-19 pandemic on food security in South-East Asia through the deployment and scaling up of digital technologies. The roundtable focused on identifying solutions to overcome the challenges that food chain actors are facing in South-East Asia, for which ICT and digital tools are expected to play a key role, together with smart policies, regulations and investments in collective action at all levels.[5] Four action areas were explored through dedicated roundtables: (i) logistics; (ii) digital finance; (iii) digital marketing; and (iv) data sharing and governance. Participants from ASEAN governments and the private sector, together with development partners, convened to identify spaces for collaboration. The results of these discussions were presented to the ASEAN Summit of Ministers of Agriculture, and several recommendations found their way into the ASEAN Comprehensive Recovery Framework in November 2020.

PROJECTS INTEGRATING ICTS AND DIGITAL TOOLS UNDER THE RURAL POOR STIMULUS FACILITY (RPSF)

In an effort to address the magnitude of the impact presented by the COVID-19 pandemic, IFAD launched the multi-donor COVID-19 Rural Poor Stimulus Facility (RPSF). This initiative is in line with the United Nations socio-economic response framework and complements IFAD's broader COVID-19 response efforts. The goal of the RPSF is to accelerate the recovery of poor and vulnerable rural people from the COVID-19 crisis. One of the pillars for financing activities under the RPSF is to promote the use of digital services. So far, 23 per cent (or US$8.5 million) of RPSF funds has been used for this purpose. Examples of RPSF projects that promote digital services in the APR region are illustrated below.

ASIAN FARMERS ASSOCIATION FOR SUSTAINABLE RURAL DEVELOPMENT: ASSURING RESILIENCY OF FAMILY FARMERS (ARISE-FARMERS) AMIDST COVID-19

In the context of the COVID-19 pandemic, utilizing the capacities of farmer organizations (FOs) in quick responses for both emergency and resiliencey-type interventions proves to be an effective way of reaching farmers. The Assuring Resiliency of Family Farmers amidst COVID19 (ARISE-FARMERS) initiative is the result of the response of FOs within the Asia-Pacific Farmers' Program (APFP). Through its three core components—emergency response, resilience response, and online and offline communication tools and knowledge management support—the initiative will address pragmatic, short-term and strategic, long-term objectives. Its third component focuses on digital tools and mechanisms, including e-commerce platforms, such as an online farmer shop for FOs and food consumers matching supply and demand for improved logistics support. The provision of localized relevant information, such as links with specific government agencies and service providers to respond to the emergency needs of farmers in lockdown areas, will also be one of the key features of the online tool. This component will also support the provision of timely information and the monitoring and visibility of all interventions. Taken together, the activities under this component aim to support both emergency and resilience. The US$2 million project aims to reach around 100,000 smallholder households affiliated with local and national agricultural cooperatives or FOs The programme's contribution is to ensure that IFAD investments in rural people, particularly family farmers and their organizations, will be protected, promoted and maximized. ARISE-Farmers will contribute to achieving the objectives of the IFAD Strategic Framework 2016-2025 through its specific focus on developing the capacity of FOsto provide responsive production and marketing support services to members.

NEPAL: SUPPORTING COVID-19 RECOVERY THROUGH ACCELERATED PRIVATE INVESTMENT IN AGRICULTURE

The RPSF grant project of US$543,000 and its additional financing of US$663,513 aims at minimizing the impacts of COVID-19 on the livelihoods, resilience and food security of poor and vulnerable rural people, accelerating their economic recovery by improving access to digital services and enabling a substantial increase in investment in the small-scale agricultural sector.

The project focuses on developing and field-testing a set of digital financial and market services and the associated rollout processes that will then be adopted by the investment projects across the country programme – the Agriculture Sector Development Programme, the Rural Enterprises and Remittances Project and the recently approved Value Chains for Inclusive Transformation of Agriculture Programme. The initial RPSF grant focuses on the development and field-testing of Agricultural Development Bank Limited's core rural digital financial services platform for the Kisan (farmer) card and app. The additional financing will be used to support the further development and roll-out of the set of value-added digital services, including technical extension advice (e-agriculture); agricultural market information and prices; and GIS-enabled geo-spatial mapping and planning tools (e.g. for crop suitability/site verification and local agrisector planning). The approach will be to build on existing good practice services and tools in Nepal, for example the Agriculture Market Information System (initially developed by the Agro-Enterprise Centre).

[5] See http://psav-mard.org.vn/virtual-asean-food-systems-roundtable-on-covid-19-.html

PAKISTAN: RESILIENCE BUILDING OF SMALLHOLDER FARMERS

The RPSF grant project of US$1 million aims at improving food security and income by linking smallholders to markets through digital tools. A digital mobile app will enable smallholder farmers to access reputable input supply companies and to purchase quality agricultural inputs (seeds, pesticides and fertilizers). Smallholders will use the given amount of US$61 (PKR 10,000) to purchase only inputs from their locked mobile wallet account using the digital channel. Through this initiative, cash transfers for inputs through e-wallets that are programmed to be used only for inputs from selected suppliers will also be provided. The opening of mobile wallets for cash disbursement will increase access to various financial services offered by the mobile wallet operators, including credit and insurance products in the future. Key benefits expected include: (i) increased productivity due to the use of quality inputs; (ii) account savings as a result of not borrowing cash from money-lenders/intermediaries; (iii) reduced cost of inputs; and (iv) increased access to financial services through the mobile wallet.

MYANMAR: FOSTERING AGRICULTURE REVITALIZATION IN MYANMAR THROUGH DIGITAL AGRICULTURE TRANSFORMATION (FARM-DAT)

The objective of the US$600,000 million project ¬– implemented by the private think tank, the Centre for Economic and Social Development, in support of IFAD loan projects – is twofold: (i) to address short-term disruptions in the food system, with the aim of improving the food security and resilience of poor rural people affected by COVID-19; and (ii) to support innovative and strategic initiatives on digital agriculture technology on a piloting basis. These pilots are intended to generate innovative solutions, approaches and methodologies that can be of value in the post-COVID-19 recovery and can be subsequently scaled up by investment projects in the country and thus benefit a wider population of rural people. Digital solutions that the project will support include: (i) digital registration of beneficiaries to ensure they are able to access a range of digital services; (ii) provision of training on digital literacy; (iii) expanded internet coverage; (iv) facilitated access to mobile money services; and (v) support to enhance regulatory, incentive and business frameworks for long-term digital transformation.

Box 1   **Precision Agriculture for Development (PAD)**

Precision Agriculture for Development (PAD) is a global non-profit organization that harnesses technology, data science and behavioural economics to provide targeted information to farmers in developing countries with the aim of improving their incomes, food security and resilience to economic shocks. PAD offers farmers useful information customized to their geography, market, and individual characteristics, setting up a two-way flow of information using SMS, interactive voice response (IVR) and other digital mobile phone-based channels to deliver low-cost, customized advice to improve on-farm practices, input utilization, pest and disease management, climate and weather resilience, environmental sustainability and access to markets.

In the context of the COVID-19 pandemic, PAD received a grant from IFAD's Rural Poor Stimulus Facility aiming for some 1.7 million small-scale farmers in Kenya, Nigeria and Pakistan to receive personalized agricultural advice through their mobile phones. At a time when traditional in-person extension services are – by necessity – being scaled back or paused, digital agricultural extension is clearly a very attractive option, especially in relation to IFAD's value for money and sustainability of results.

Looking forward, IFAD's ambition is to continue to work with PAD and other partners to scale up digital extension solutions, including value chain and weather-related advisory services. The preliminary results from this exciting partnership make a strong case for long-term investment in digital agricultural extension.

CAMBODIA: RAPID SCALING UP FOR SMALLHOLDER HOUSEHOLDS THROUGH INFORMATION TECHNOLOGY IN RESPONSE TO COVID-19 (RUSH-IT)

So far, Cambodia has suffered only limited transmission of COVID-19 in the community but has been severely affected by the economic consequences, which include the return of overseas migrant workers, lost employment in the important tourism sector and a slow down in other sectors, including construction. Smallholder farm households face lost income from employment and remittances and direct impacts on agricultural markets and find themselves with surplus labour and additional mouths to feed as migrant workers return to their villages. Building on the successful roll-out of the Chamka application, RUSH-IT will allow affected farmers to apply online for grants to invest in production-boosting inputs. Grant applications will be screened and approved via the app, which will also facilitate monitoring and reporting of results. Links to digital payments for transfer of the grants are being explored.

INNOVATING IFAD'S OPERATIONS BY MAINSTREAMING DIGITAL AGRICULTURE: IDEAS FOR A WAY FORWARD

From the examples above we derive clear evidence that, across IFAD's programmes in Asia and the Pacific, the design of digital technologies and ICTs, and access to them, represents an important and growing theme within the broader agenda of inclusive and sustainable transformation of smallholder agriculture. There is enhanced awareness of the importance of integrating digital technologies into the delivery of services that are essential to the competitiveness and viability of smallholders. However, there are also some critical gaps and barriers that need to be addressed if IFAD's investments in ICTs and digital tools are be transformative at scale and realize their full potential.

First, there is no systematic attention to designing interventions that are consistent with the nine principles of digital development. A long history of engagement in digital agriculture by many development partners has distilled key principles that are meant to reduce the risk of failure in ICT4D projects while safeguarding the drive for innovation.[6] These principles include: (1) design with the user; (2) understand the existing ecosystem; (3) design for scale; (4) build for sustainability; (5) be data driven; (6) use open standards, open sources, open data and open innovations; (7) reuse and improve; (8) address privacy and security; and (9) be collaborative. Taken together, these principles could form the core of a quality assurance process for interventions in digital agriculture. While the design of digital solutions supported by IFAD's programme in Asia is implicitly consistent with many, if not most, of the nine principles, such consistency is not verified systematically. A more systematic verification of consistency with the nine principles can be expected to further enhance the quality and impact of the supported solutions.

Second, IFAD's digital agriculture interventions in Asia and the Pacific remain, with few exceptions, focused on supporting the design and adoption by smallholders of specific digital tools and ICT. With the exception of the Cambodia and Myanmar programmes, there is limited attention devoted to gaps at the strategic and ecosystem level, such as coherent national agricultural digitalization strategies and enabling policy and regulatory frameworks. For instance, data sharing among farmers, service providers (including governments) and other value chain actors has tremendous potential to improve the competitiveness of smallholders and unlock the provision of services and products that better suit their needs.[7]

Third, as eloquently argued in a recent study,[8] there is a need to develop strategies for building the digital skills of a large number of smallholders in Asia's remote and rural areas. Addressing this gap requires working in partnership with national and regional FOs, civil society and private sector organizations, extension services and the academic sector.

Fourth, it is essential to fostering coverage and connectivity in Asia's remote and rural areas. While coverage has expanded rapidly during the past decades, large parts of Asia's rural areas have not yet witnessed the move from 2G to 3G technologies and above. Remote areas are deprived of access even to 2G technologies. Creating incentives for the private sector to expand coverage and for improving connectivity in rural and remote areas inevitably requires some degree of government intervention, including appropriate regulations and smart subsidies.[9]

Moving forward, the lively engagement that IFAD is demonstrating at the field level in terms of supporting digital solutions that have a positive impact on project beneficiaries and partner government agencies, could be further enhanced by a complementary focus on challenges that constrain a more systematic scaling up of digital technologies in support of smallholder agriculture. Scaling up the use and impact of digital technologies requires working in and through strategic partnerships. Solutions should be designed to match both the needs and the digital skills of smallholders, coherently with the principles of digital development. This requires working on the supply side of digital solutions by creating an enabling and competitive

[6] https://digitalprinciples.org/

[7] See Status Report: Recommendations from the Working Groups on a Regional Response to COVID-19 (GrowAsia, 2020)

[8] Smallholder Digital Adoption in Southeast Asia (GrowAsia and IFAD, 2020)

[9] Enabling Rural Coverage: Regulatory and policy recommendations to foster mobile broadband coverage in developing countries (GSMA, 2018)

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environment for agritech and fintech companies, the most successful of which should be accompanied in their scaling up efforts through appropriate financial strategies. There is also a need to work on the demand side of the market for digital solutions and foster digital skills among smallholder communities and organizations across Asia. Governments' capacity needs to be developed and strengthened to ensure that an enabling ecosystem is in place to support, on the one hand, a dynamic market place for digital solutions but, on the other, also to establish a regulatory environment that protects the privacy and ownership of the data that farmers provide when using digital tools. Last but not least, creative policies, strategies and programmes are needed to expand or upgrade broadband coverage in Asia's underserved rural and remote areas. In such a complex environment, IFAD's comparative advantage needs to be assessed in relation to that of other development partners. A good example of how to do this is the Roadmap for the digitalization of smallholder agriculture in the ASEAN (ISF, Grow Asia, and IFAD 2020). To create a disruptive value proposition for governments and farmers communities and to help them make the quantum leap into the world of digital technologies, IFAD needs to work through strategic partnerships while focusing on its comparative advantage. Such partnerships could cover a wide span of themes: digital agricultural strategies, expansion of broadband coverage in rural and remote areas, digital farmer registries, and regulatory environments for data ownership and inter-operability. Bringing these partnerships into a coherent strategy will require investments in knowledge development and in knowledge sharing events. Welcome in this regard will be the Symposium on Digital Agriculture that the Ministry of Agriculture, Food, and Rural Affairs, which the Republic of Korea is planning on holding in 2021. The Symposium will provide an opportunity for partners, the private sector and governments to come together and identify areas where efforts can be brought together to maximize disruptive impact.