Food and Agriculture Organization of the United Nations

Empowering smallholder farmers to access digital agricultural extension and advisory services

INTRODUCTION

Agricultural extension and advisory services (AEAS) systems have been changing over the past decades and continuously adopting new tools and methods to improve their efficiency. Among the new tools, the adoption of digital tools to improve service delivery is significant. This shift has been driven by development initiatives that integrate digital agriculture as a core strategy to improve agricultural production, public-private partnerships (PPPs), availability of digital AESA information resources. The COVID-19 pandemic has triggered and broadened use of digital tools for sharing information, delivering AEAS to farmers, and to some extent receiving the feedback from them. Digital technologies bring new opportunities for AEAS delivery, including improved accessibility to services in geographically remote areas, bridging the information gaps among different value chain actors, and contributing to fair trade, market accessibility, social and financial inclusion and so on.

Digitalisation of AEAS can enhance accessibility, delivery, transparency, scope and impacts of information and services for smallholder farmers, including rural youth, rural women and other vulnerable groups. Major digital AEAS initiatives have started to provide a range of services, including agricultural advisory services, market linkages, financial access, supply-chain management, agricultural intelligence and various kinds of bundled services. However, smallholder farmers face a variety of challenges and capacity gaps in accessing digital AEAS.

Recent studies have revealed that smallholder farmers' low digital literacy, along with insufficient digital human capital development and infrastructure investments in rural areas, has become paramount barriers and constraints for them to access and effectively realise the potential of digital AEAS (Awadalla, 2019; CTA, 2019; Monica *et al.*, 2021; Evans, 2019). Radio was the most prevalent device used by farmers to access AEAS in Kenya (84 percent) and Uganda (76 percent), followed by television (58 percent in Kenya and 36 percent in Uganda) and mobile phones (32 percent in Kenya and ten percent in Uganda), and use of computers by smallholder farmers were less than one percent in Kenya and three percent in Uganda (Monica *et al.*, 2021). In many developing counties, smallholder farmers lack digital tools and literacy, and affordable internet services due to high internet costs (Hudson *et al.*, 2017; CTA, 2019; Monica *et al.*, 2021). Therefore, smallholder farmers need to be empowered by innovative approaches to enable them to access digital AEAS and achieve economic, environmental and social gains sustainably, thus leaving no-one behind in the era of digital technology advancements.

KEY MESSAGES

Empowering smallholder farmers to access digital AESA entails the following:

- Government commits itself to strengthening human capital and infrastructure development and farmer education on digital literacy, with the support of public policy and private sectors: (1) develop appropriate data stewardship strategies and data privacy protection measures to guide and manage data infrastructure investments and constructions; (2) enhance infrastructural investment to provide digital tools and affordable mobile and internet services to smallholder farmers including the most vulnerable; (3) build capacity in digital literacy for smallholder farmers and staff of all sectors at all levels of agricultural administration and public extension and advisory sectors, supported by adequate funding and clear regulatory framework; and (4) provide public funds to support digital AEAS and ensure more demand-driven digital AEAS.
- Extension agencies integrate farmer education on digital literacy into their mandate as the essential service provided to meet smallholder farmers' practical needs. Monitor and evaluate public AEAS providers' performance of digital AEAS, with specific attainable goals and indicators. Design digital AEAS systems and programmes based on the most recent digital innovations and successful digital business models.
- Farmers and their organisations are empowered to access, appreciate and support digital AEAS innovations and developments. Create alliances with the participation of all key stakeholders, build partnerships between governments, donors, investors and digital business sectors, and strengthen digital human capital and infrastructure development in rural areas with more holistic approaches. Farmers and the relevant actors of digital AEAS are supported by enabling public and private institutions.

Empowerment of smallholder farmers to access digital AEAS through enabling policies and institutional supports

- Review current agricultural extension policies and institutional structures to develop a framework of agricultural extension policy reform to enhance digital AEAS.

- Issue relevant policies and mechanisms to empower smallholder farmers to access digital AEAS. Explicit, demand-driven and mandatory standards or criteria and incentive schemes on digital AEAS and infrastructure aimed to address specific demands and needs of smallholder farmers should be created and executed.
- Establish a coordination mechanism between different government departments, including agriculture, education, information and communication technology (ICT) management and financial departments for collaboratively supporting digital AEAS and infrastructure development in rural areas.
- Introduce financial mechanisms to promote and support the commitment to and coordinated participation of AEAS agencies, farmers and their organisations, NGOs, ICT entrepreneurs and industries and private sectors in joint actions on the provision of digital AEAS and infrastructure development in rural areas.
- Engage the hardest-to-reach smallholder farmer segments, especially women, by incorporating gender targets as part of the investments and explicitly fund grantees who prioritise women in terms of education on digital literacy and digital infrastructure development in rural areas.
- Establish strategic digital innovation platforms to improve digital AEAS at national and local levels.

Empowerment of smallholder farmers to access digital AEAS through farmer education on digital literacy

- Conduct needs assessment to review capacities of AEAS providers and understand smallholder farmers' needs of digital AEAS based on existing infrastructure, and identify education and training needs of smallholder farmers to access digital AEAS and relevant needs of capacity building of AEAS providers.
- Analyse and identify gaps between smallholder farmers' realities and their potential which could be harnessed through digital AEAS, and set up goals for empowering smallholder farmers to access digital AEAS. Actions should be taken to improve farmer educations on digital literacy and digital infrastructure development in rural areas.
- Develop education guidelines and training curricula to enhance smallholder farmers' digital literacy based on needs assessment.
- Empower AEAS providers through training of trainers (TOT) courses, e-learning platforms and practical implementation of farmer education activities on digital literacy.
- Promote farmer participatory education and training courses on digital literacy to build up farmers' capacities and skills for searching and access to digital AEAS through available digital devices, including radio, TV and mobile phones in rural areas.
- Conduct demonstration and extension programmes through extension and advisory agencies, private sectors, NGOs, digital platforms and farmer organisations to explore and scale up the empowerment of smallholder farmers to access digital AEAS.
- Develop necessary infrastructures and facilities, for example, multi-actor innovation platforms, digital platforms, farmer digital vocational schools, farmer digital training schools etc., to host joint actions on farmer education on digital literacy and access to digital AEAS.
- Review existing rural information dissemination and exchange systems to enhance linkages and strengthen participatory and demand-driven digital AEAS. Promote use of ICT

and multi-actor innovation platforms to support smallholder farmers' education on digital literacy and access to digital AEAS.

Empowerment of smallholder farmers to access digital AEAS through coordinated joint actions

- At policy level, promote coordinated joint planning and decision-making to take into account needs of different stakeholders and regions based on local contexts. On this basis, identify gaps and set up attainable goals and targets on strengthening human capital and infrastructure development and farmers education on digital literacy in rural areas.
- At institutional level, engage different sectors such as AEAS, education, ICT enterprises, inputs supply, agribusinesses, NGOs, investing and financial agencies and farmer organisations to jointly take coalitional and coordinated actions to promote human capital, knowledge co-creation and sharing, infrastructure development and farmer education on digital literacy. To this end, also enhance PPPs with the integration of incentives for inclusive, results-oriented and accountable initiatives and actions aimed at strengthening smallholder farmers' access to digital AEAS. Highlight the role of lead farmers and farmer organisations in consolidating and scaling up coordinated joint actions.

Remember!
Empowerment of smallholder farmers to access digital AEAS should be concretised in explicit political commitments and concrete actions. For example, engage them actively through planning, designing, monitoring and evaluating (M&E) digital AEAS. Besides, enable them to exchange, share and provide feedback on digital AEAS through multiple interactions of farmer-to-extension, farmer-to-farmer, farmer-to-private sector, etc.

EXAMPLES

East Africa – Digitalisation represents a unique opportunity to deliver much needed, one-to-one smallholder farmer extension and cost-effective and real-time AEAS. Green Dreams TECH Ltd. sought to harness this opportunity in 2010 by developing the award-winning mobile-phone agricultural platform called iCow. This platform was designed to support smallholder farmers to address their individual farming priorities across livestock and crops through a virtual platform. It focuses on the most basic feature phones and is currently available in English, Kiswahili, Amharic, Tifygna and Orimiffo. iCow is at the forefront of building tools to enable smallholders to become globally competitive by integrating their production data into global datasets, with resulting value delivered to the farmers in real-time. Thereby, it closes the opportunity gap between farmers in developing and developed countries. In addition to providing e-AEAS on livestock and crop production, iCow also connects farmers to input providers, agricultural financial service providers, veterinary experts, agricultural extension service providers, NGOs, governmental and other value chain actors. Since 2010, over 1.6 million smallholder farmers have benefited from the application, with the majority in Kenya and including 21 thousand Ethiopian and 19 thousand Tanzanian farmers.

Farmer in Kenya accessing iCow platform to consult advisory services.

Dairy farmers saw an increase in milk production by two to three litres per day, and an increase in their incomes of USD 25 per month. Recent data have shown that farmers using the maize calendar, a newly launched product by iCow, have almost doubled their yields and those following sustainable soil conservation and regeneration have improved their soil fertility and earning potential.

Latin America and the Caribbean – In Latin America and the Caribbean, the Plantwise platform led by the Centre for Agriculture and Bioscience International (CABI) used a series of digital tools to reach smallholder farmers with timely diagnosis of crop problems and recommendations to reduce the impact of pests and diseases on yields. For example, live online plant clinic sessions on Facebook were launched by the Extension, Training and Information Services Division (ETISD) of the Ministry of Agriculture of Trinidad and Tobago to reach farmers during the lockdown caused by COVID-19 pandemic. SMS messages were used in Jamaica by the Rural Agricultural Development Authority (RADA) to quickly reach 2 553 farmers throughout the island with information to control the lettuce pest complex. Social media such as Facebook, YouTube and WhatsApp have been widely used in Latin America and the Caribbean in order to increase farmers reach, especially during the COVID-19 restrictions.

Village video screening on FAW control techniques.

Short videos teaching how to recognise and control crop problems have also been extensively used in what the Plantwise programme calls “mass extension campaigns” focused on a key crop problem and timely delivered when farmers should start monitoring it. Thousands of smallholder farmers have started to follow the programme publications led by local implementing organisations in each country. In Peru, the Ministry of Agriculture (INIA) established an advisory YouTube Channel transferring technical information on key crops to farmers in the whole country, reaching around 3.5 million farmers in 2020. WhatsApp support groups for diagnosis and recommendations have been one of the digital-based tools most highly appreciated by user countries in Latin America. Originally created for remotely supporting plant doctors with photo-based diagnosis, new groups were created to bring together plant doctors and farmers to maintain remote assistance during the COVID-19 pandemic. The use of social media and internet-based official platforms has continued to grow within the Plantwise countries for sharing information relevant to farmers.

China – Pinduoduo.com operates China’s biggest agricultural platform, connecting more than 12 million farmers to its user base of 788 million consumers. In 2020, the company handled CNY 270 billion (USD 42 billion) worth of agriculture-related orders. Working jointly with local governments and agronomic research and extension institutes, Pinduoduo has created integrated programmes that address the value chain from upstream to downstream, beginning with the organisation of smallholder farmers, what and how farmers plant, and how they sell to the end market. Training plays an important role in Pinduoduo’s promoting digital inclusion and accelerating the digitalisation of the agricultural system. To help more smallholder farmers sell online, Pinduoduo has trained more than 100 thousand smallholder farmers who became digitally competent through its Duo Duo University programmes on e-commerce business operation. The training programmes teach skills in an array of topics ranging from accounting, marketing to store operation.

Pinduoduo training new young smallholder farmers through its Duo Duo University programmes on how to run an e-commerce business.

Many of these new farmers are rural youth who left the countryside to seek livelihoods in big cities. Armed with new e-commerce skills, many have returned to their hometown to set up online businesses to help market local agricultural products to a national market. This has helped widen the market access and consumer demand for their products, giving

these farmers more security in selling what they have grown. Beyond training people how to sell their products, Pinduoduo also works with agronomic research and extension institutes and local authorities to improve the agricultural practices of local farmers. Trainers from the China Agricultural University have worked with Pinduoduo to impart agronomic knowledge on various crops, from planting to crop management, to benefit smallholder farmers.

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