Results of the perception survey and consultations as part of the Collective Action on Inclusive Digital Transformation of Agriculture

In 2022, AFA partnered with the Global Forum on Agricultural Research and Innovation (GFAR) and Agricultural Research Associations (APAARI) in the Collective Action on Inclusive Digital Transformation in Agriculture that aims at empowering small-scale producers to co-develop good practices and negotiate business models that work for them, and at making all other actors in the Digital Agriculture value chain more open to new inclusive practices and business models.

AFA became interested in the Collective Action in order to i) increase AFA members awareness and understanding of the challenges and positive benefits associated with DA, ii) collect feedback from AFA members and partners about their perception and experiences related to DA and the support needed to benefit from DA, iii) develop recommendations (design-suggestions, models) for decision-makers, development partners, and business sector, and iv) influence the plans and strategies of development partners.

The findings of the survey and consultations can be used to guide future collaboration among stakeholders.

1. SURVEY

The survey was conducted from September 2022 to May 2023. Findings were used to craft recommendations and the Call for Action.

Part I. Farmers' Profile

A total of 372 farmers from 12 Farmers' Organizations from nine countries (Bangladesh, Cambodia, India, Indonesia, Japan, Laos, Mongolia, Nepal, and the Philippines) participated in the survey. Thirty-five percent of the responses came from female farmers and sixty-five percent were from male farmers. Thirty-six percent are between 41 - 60 years of age. Twenty-two percent are aged 25-35 years old.

Close to 80% of the participants are small-scale farmers (who own up to 2 hectares of land). The survey showed that more than half of the farmers live close (< 1 km) to their farms. Of the total respondents, an equal share (almost 30%) of farmers have been farming for 5-10 years and 11-20 years and almost half of the respondents completed secondary education.

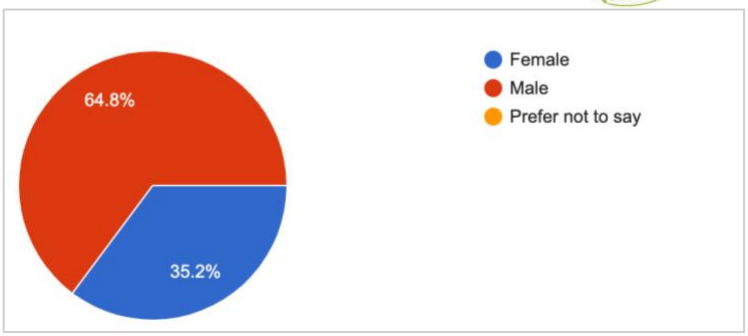


Figure 1. Gender distribution

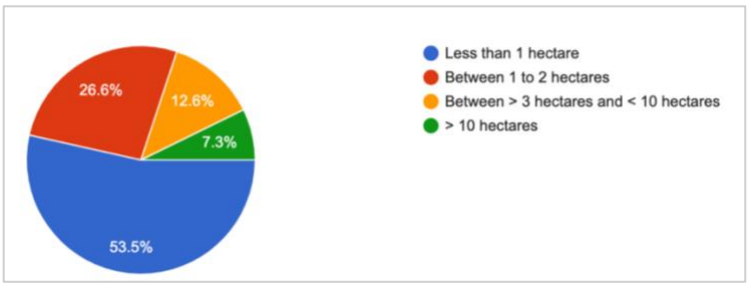


Figure 2. Farm size

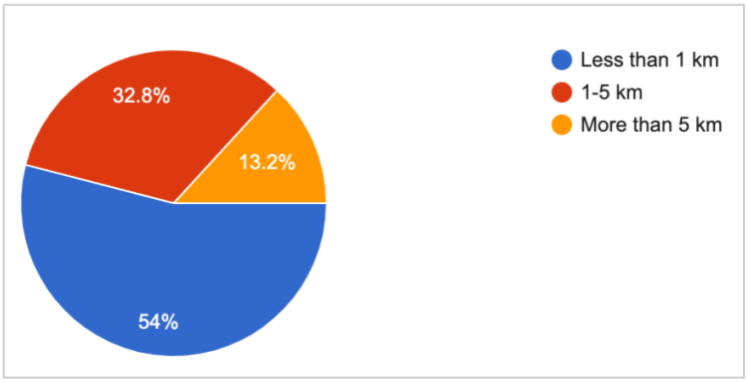


Figure 3. Distance of homes to farms

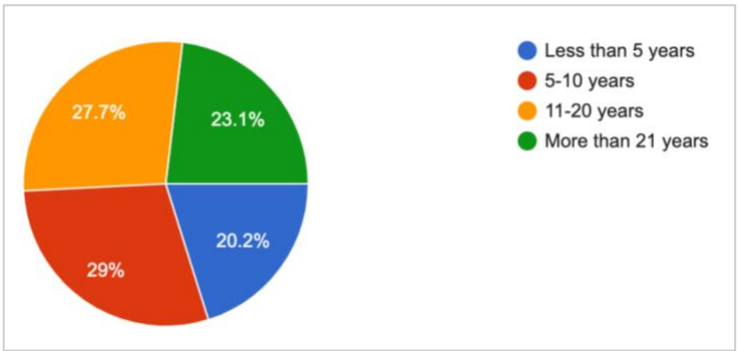


Figure 4. Experience in farming

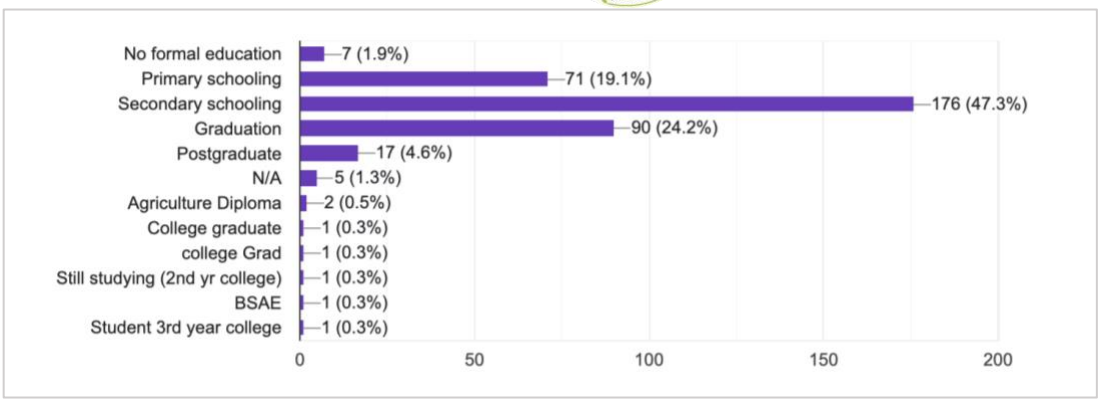


Figure 5. Educational attainment

Farming practices

The survey showed that forty-five percent are practicing lowland farming and forty-two percent are practicing integrated farming. A small percentage of farming practices mono-cropping. The different types of farming systems must be considered in developing digital agriculture technologies.

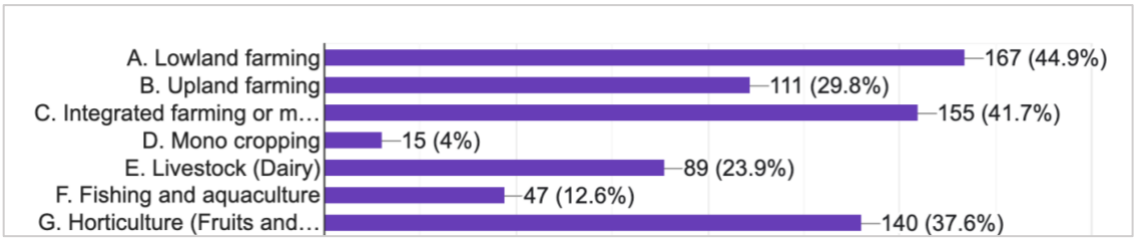


Figure 6. Farming practices

Membership to organizations

Only eight percent of the respondents are not members of farmers' organizations. Working with organizations and cooperatives of small-scale farmers is highly relevant due to the fact that digital solutions are unaffordable and cannot be easily sustained. Farmers' organizations have access to financial resources that are needed to take advantage of digital solutions such as delivering information or e-commerce.

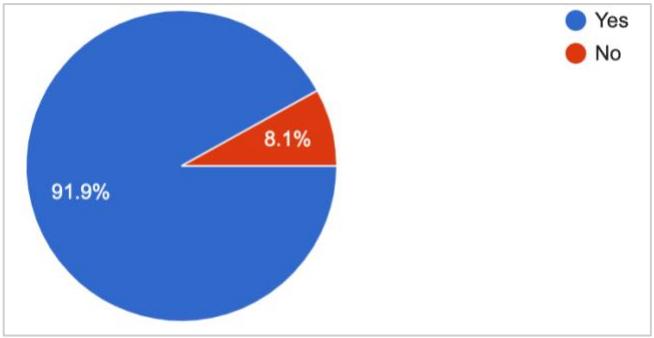


Figure 7. Membership to farmers' organization

Part II. Farmers understanding of and readiness to use digital technologies

A. Connectivity

In general, almost all of the farmers who took part in the survey are able to use basic digital communication devices such as smart mobile phones. Most (98%) own a mobile phone. of them own a mobile phone, with a huge percentage – 80% - using smartphones and about 20% using basic phones. The survey also showed that family members of the respondents are using smartphones. However, when it comes to computer access, the majority (60%) of the participants don't have access to it.

Eighty-six percent live in communities with internet connections. Most (75%) respondents said their internet is provided by a national telecommunication company.

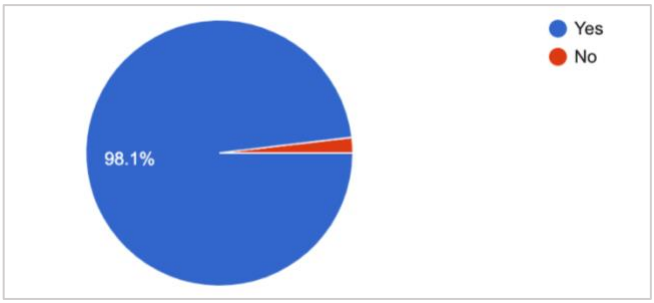


Figure 8. Access to a mobile phone

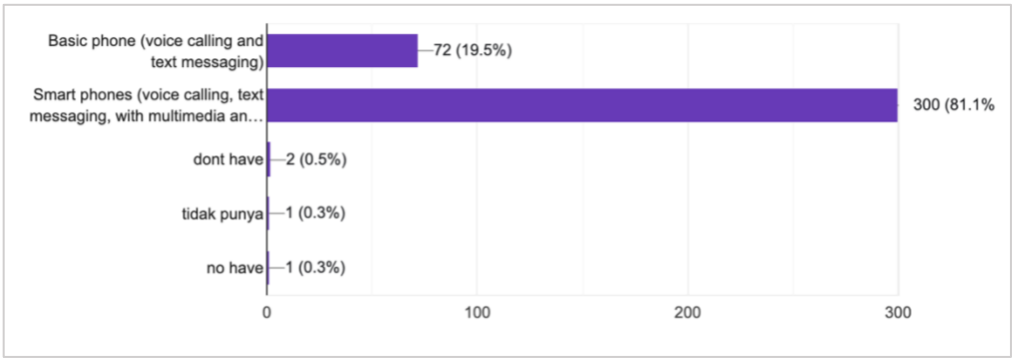


Figure 9. Type of mobile phones owned

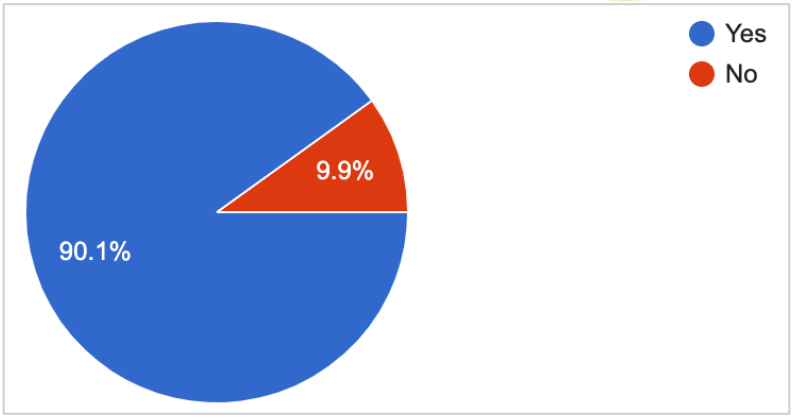


Figure 10. Access to mobile phone by family members

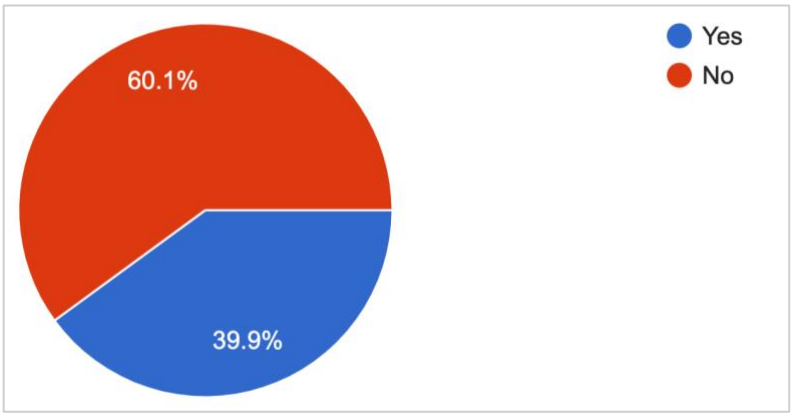


Figure 11. Access to a computer

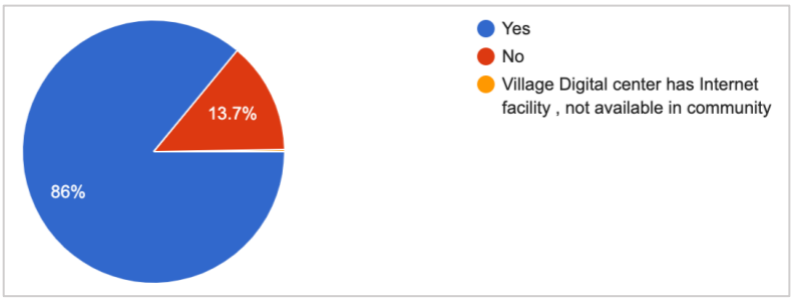


Figure 12. Availability of internet

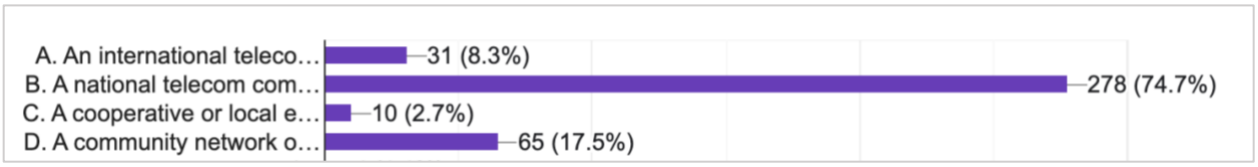


Figure 13. Internet service provider

B. Readiness

There is a general perception that digital tools and technologies can increase productivity, save labour costs, and raise income. When it comes to readiness, about 73% said they are ready to use digital technologies like mobile-based applications and are willing to recommend the adoption of digital tools to other farmers. Mostly, farmers are familiar with digital solutions related to Market linkage (e.g. Farmer to the online retail market, Traceability, Quality assessment, etc.) and about 25% said they heard about agricultural drones and robotics. Forty-six percent expressed willingness to pay service fees to use digital tools and forty percent are neutral.

Forty-two percent of the respondents have used weather forecasting applications and thirty percent haven't used any. Such results show that small-scale farmers benefit mostly from digitally delivered information and services as compared to production-related digital technologies.

When it comes to information on improved agri practices and digital technologies, half of the respondents said that their sources are still conventional methods such as training and group activities, and a significant percentage (41%) rely on their own knowledge and experience to improve their farming practices. Desk review has shown that there are governments and other development agencies who have started digitizing their training (use of YouTube for example). However, the survey showed that most farmers don't have a stable internet connection. This must be considered when digitizing extension services and technical assistance.

Thirty-five percent said that their digital agri services are mostly from private companies and thirty-two percent said it is from their cooperatives or organizations.

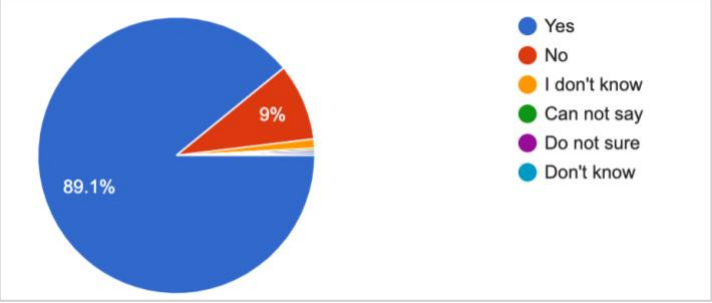


Figure 14. Link between digital tools/ technologies and increase productivity, save labour cost and raise income

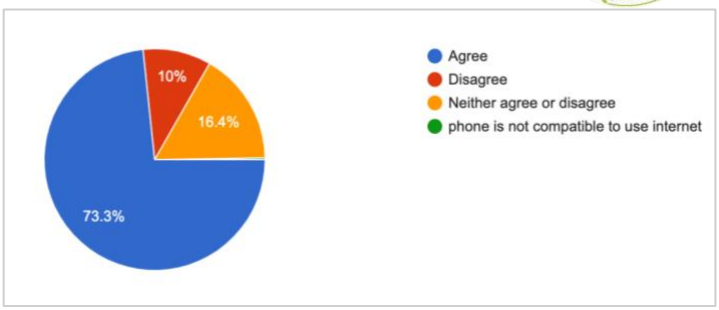


Figure 15. Readiness to use digital tools

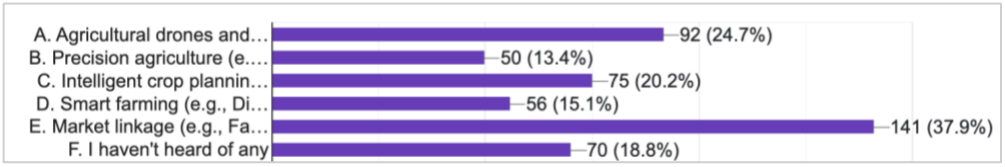


Figure 16. Familiarity to digital solutions (heard about)

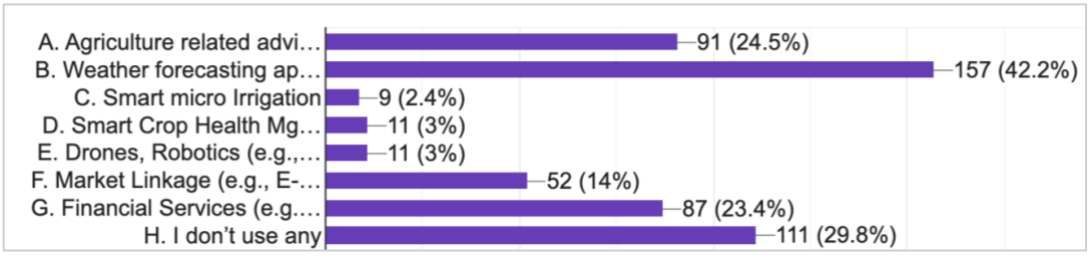


Figure 17. Familiarity to digital solutions (used)

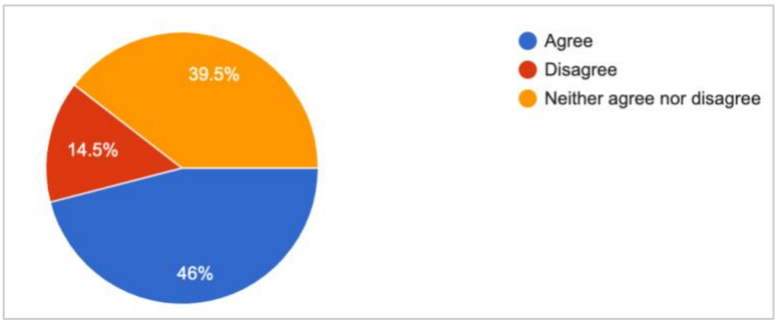


Figure 18. Willingness to pay for service fees

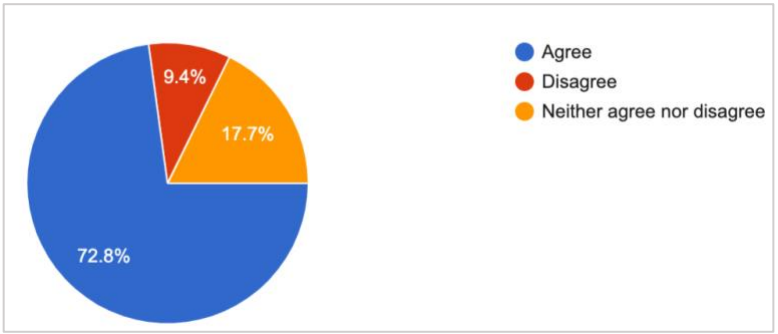


Figure 19. Willingness to recommended the use of digital tools

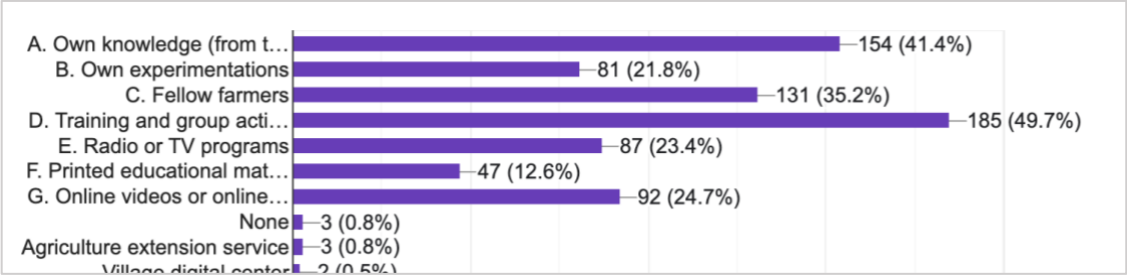


Figure 20. Sources of information

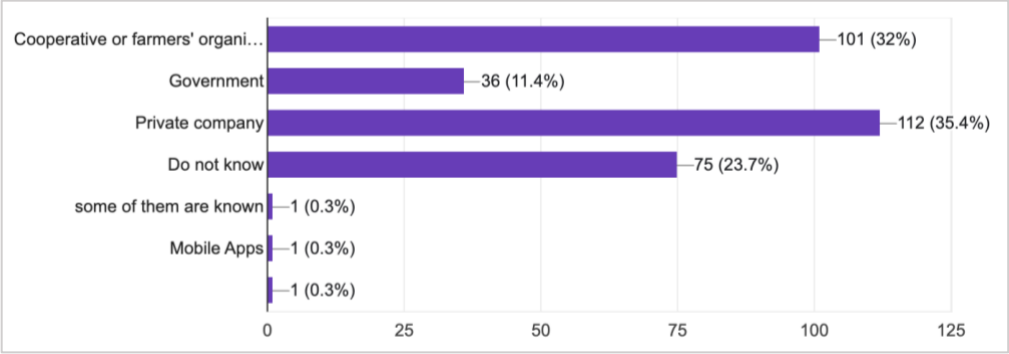
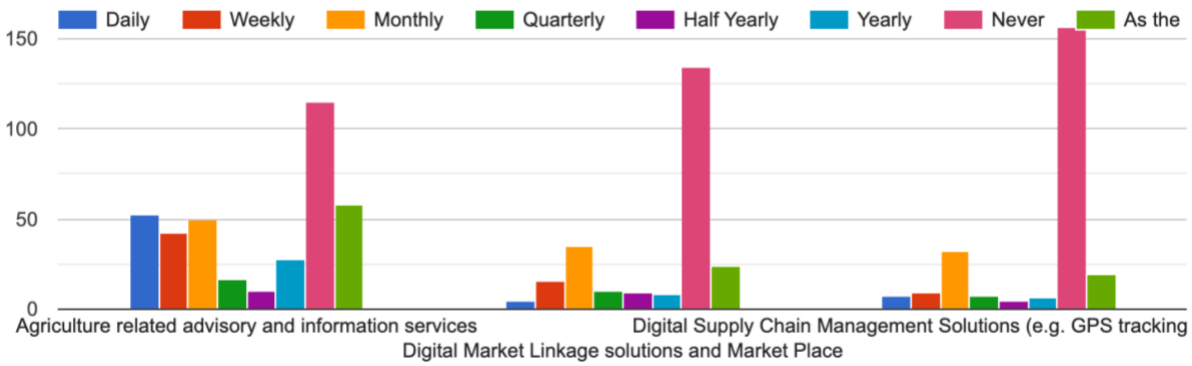


Figure 21. Providers of digital solutions

Frequency of use

In terms of frequency, there are more farmers who never used the technologies or digitally-delivered services mentioned in the survey. Below are the specific results:

- Agriculture related advisory and information services– 35% (115) never used any of them
- Digital Market Linkage solutions and Market Place – 36% (134) never used it any of them
- Digital Supply Chain Management Solutions (e.g. GPS tracking, radio frequency identification (RFID), barcodes, smart labels, location-based data and wireless sensor networks)– 42% (156) never used any of them
- Digital Financial Services (e.g. digital payments, savings, smallholder credit, and agricultural insurance, etc.)– Thirty-two percent (118) never used any of them



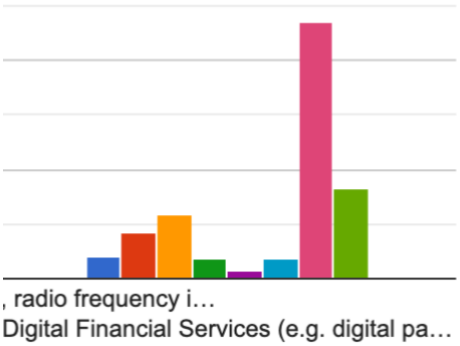


Figure 22. Frequency of use

Challenges and opportunities in the use of digital technologies

The following are the perceived barriers/ obstacles in using digital technologies:

- Unstable Internet connection – 35 percent
- Don't know how to use or lack of confidence to use (Lack of skill) – 34 percent
- I am not trained enough about the use of these digital services/ There are not many training classes about the use of these digital services in my community – 32 percent
- Unaffordable services or technologies – 19 percent
- I find information but hard to understand and use the services, not user friendly – 16 percent
- Level of skill is inadequate to understand and use available digital apps and services – 14 percent

Activities that can be enhanced by Digital Agri Technologies or digital tools and can be the basis for co-designing are as follows:

- To receive early warnings and information about climate change that will allow me to react in time – 43 percent
- To detect diseases – 37 percent
- To make better use of water, fertilizers, herbicides and/or pesticides – 29 percent
- To receive training – 21percent
- To lower the cost of purchasing inputs – 20 percent
- To find new buyers and improve the sale prices of my production – 19 percent
- To Receive information about government schemes and benefits – 17 percent
- To receive information related to local markets – 17 percent

2. FOCUS GROUP DISCUSSION

A focus group discussion was done in Cambodia by Farmer and Water Net (FWN). FWN, a national network of Farmers' Water User Communities (FWUCs), organized focused group discussions with its members. FWN was approached to pilot test the use of drones in the application of pesticides.

Key findings are as follows:

- The 2 FWUCs have been introduced to a mobile application called CHAMKA which was developed by a private company with support from IFAD and the government. The app is a platform where i) farmers can get technical information related to production, ii) agri input providers upload their products, and iii) farmers can sell their produce. However, their members haven't fully used the mobile application because they either don't know how to navigate or use it.

- Most farmers who participated in the FGDs expressed interest in **drones and robotics service**s. They have been introduced to drones as part of the testing activities. It was explained to them that the application of pesticides through drones will help farmers avoid the usual risks of inhaling pesticides. In addition, it can save them time as compared to their traditional methods. However, it was expressed that the service fee can be expensive and that the machine itself is expensive.

- On intelligent crop planning, only 30% expressed interest as this can reduce production costs, and that this approach can be applied to traditional methods. On using smart farming like sensors, many were skeptical because this may not be relevant to small-scale farming.

- Advantages and disadvantages of digital agriculture tools/technologies to small-scale farmers

Table 1. Advantages and disadvantages as identified during the FGD

Advantages	Disadvantages
▪ The use of drones in the application of pesticides will prevent its impact on human health ▪ Saves times ▪ Can be more precise and efficient so the impact on the environment is reduced ▪ Reduce production costs ▪ Increase yield ▪ Quality products can be ensured and can have access to more market	▪ Most farmers are of advanced age and are having a hard time catching up and are hesitant ▪ Digit technologies are expensive and can reduce farmers' income rather than improve it

- **Possible challenges associated with digital agriculture**
  - Poor internet speed in rural areas
  - Unavailability of equipment repair service centers in rural areas

- Lack of people in rural communities who are highly trained to operate digital technologies

- **Recommendations**

  - Development agencies and government to invest in research and development that integrates digital agriculture and farmers' challenges
  - Digital agriculture should be designed to improve the quality and standardization of agricultural products
  - The government should promote effective partnerships among farmers, the private sector, and other stakeholders along the supply chains
  - Support public-private partnerships to facilitate the financing of digital agriculture projects and programs that respond to the realities of small-holder farmers
  - Initiate and support cooperation between farmer groups, educational institutions, and the private sector.

3. EXPERIENCE SHARING

A. Philippine Family Farmers' Agriculture Fishery Forestry Cooperatives Federation or AGRICOOPh – Digitalization to engage in value chain development and market

AgriCOOPh is a national federation of agricultural cooperatives in the Philippines. To better serve their members (primary cooperatives), AgriCOOPh has embarked on digitalization. For them, this will also support their value chain development initiatives.

For AGRICOOPh, digitalization can address 3 key challenges such as i) lack access to key information among farmers, ii) lack of market linkage, and iii) lack of access to finance and sustainable investments.

AGRICOOPh started with digital strategy development, which is for them a key to the transformation of processes. The digital strategy served as their guidepost in engaging with system development and in engaging with developers who are offering their services and existing digital platforms. AgriCOOPh believes that the strategy will ensure that digital technologies are in line with existing business models of cooperatives. They have decided to create a digital platform.

Their digital strategy has 3 components:

a. The cooperative's business model - what is the profit-making plan – product to sell, target market, and expenses to be incurred
b. Operational processes (farmer-level, farmer organization or cooperative, network/federation level)

c. Customer engagement/touch points/interface – how to win the hearts and minds of the customers

AGRICOOPh opted for an in-house digital platform, one that they own and can control. But before this, they also explored other options such as outsourcing from a third-party provider. However, during their exploration, they found that it is costly to buy and acquire an existing platform because one has to pay for the source code. They have encountered software that can cost up to USD$1 million and the cheapest is USD$175,000. Another option is to pay a monthly subscription fee. However, to them, this is also not feasible because of the regular monthly subscription fees that are fixed. They also encountered other digital platforms where one can pay annual dues for every farmer that will be part of their system. The limitation is that it will require a large number of farmers - 100, 000 farmers. It will be difficult to sustain a large number of users. Additionally, they also encountered and engaged with companies that offer the usual digital supply chain (tagging, procurement, certification, blockchain, QR codes) services and production technologies like sensors for pest and disease detection.

Through their research, they learned more about important aspects related to e-commerce that they need to plan for – social media footprint, signs for others to find them (Instagram, Facebook), organic search results, customer engagement, and brand recognition.

Having an in-house platform is the most feasible and effective because they can have it customized and synchronized with their business models or operations. During their platform development they learned that agricultural cooperatives who are interested in having an online platform should understand first and foremost the implications, whether or not digital technologies will lead to a change in their business models, secondly, will it add value to their existing business, thirdly, will it change their target customers, and lastly how can it increase the value of their products.

AgriCOOPh has opted to have 4 digital platforms. They have prioritized them based on their needs and resource availability. There are too many options being provided and so they started with the following:

- Agricultural Value Chain – Farm pro – total investment USD$10,700
  - Farmer profile (Personal, location, farm, field, communication, financial, credit, insurance, & production)
  - FO/Coop profile
  - Farm management/farm plan and budget – interactive
  - Market information/ market bulletin
  - Platform administrator (FO/Coop, Federation/network

- E-commerce platform – USD$3,500
- E-learning - USD$5300 – training modules, driven by the system

- Member coop / FO database system – FO/Coop that will capture all data required - USD$1,800

The platform will initially be used by 3 farmers' organizations and cooperatives that are into coffee. They plan to start with 300 farmers. They will need 3 field technical officers who will do the profiling and a consultant/programmer.

The experience of AgriCOOPh has shown the crucial roles of cooperatives to enable their members to take advantage of digital tools to enhance the delivery of information and advisory services and market linkage. The process they went through have underlined the importance of seeing digitalization within the overall framework of the organization and as an enabling mechanism to tackle the challenges of small-scale or smallholder farmers.

B. Self-employed Women's Association (SEWA)

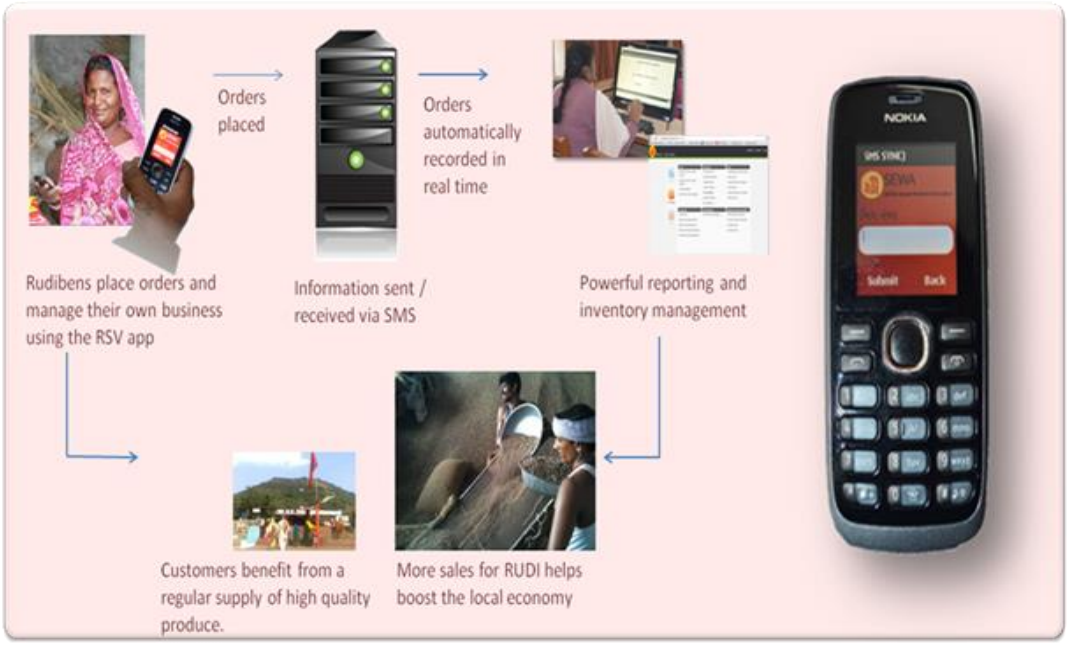


Figure 23. SEWA's Digital processes

SEWA believes that the financial inclusion of women helps in poverty reduction. Financial inclusion is a key financial reform that can be brought about at the grassroots level and can be termed a financial revolution through digitalization. The financial revolution has the potential to drastically change the lives of women.

SEWA has focused on the use of technologies by grassroots women to increase efficiency and cost-effectiveness. To fulfill its goals, SEWA has partnered with several organisations and piloted innovative ICT-based applications. These

applications are designed in Gujarati and emphasis the ease of usage to improve the grassroots operation.

SEWA provides digital literacy to its members. For example, training on using digital payments such as debit cards, ATM cards, etc. These demonstrations are given in a theoretical as well as practical manner by our Master Trainers. The aim is to build the digital capacity of grassroots members.

Voice Message based Mobile Technology
Regular and timely updates-Weather predictions, Crop Advisory, Market Price of commodities, and Government Schemes related to agriculture. This helps the farmers to make decisions on what to produce, when, and where to sell their produce.

PaySe
A peer-to-peer payment solution that takes the digitization of payment collection. This helps reduce the need to collect and handle cash for the master trainers increasing convenience

and also saving time. PaySe has been pilot tested in 10 saving groups in Mehsana District. It has now been extended to 50 groups in the second phase.

mPaise
mPaise is another digital money solution that functions like PaySe. The difference between mPaise and PaySe is that here the master trainers carry a phone and convert cash to digital money with a local recharge vendor.

mBachat
A mobile-based saving collection system. mBachat, a multilingual android app, used by master trainers to collect member-wise savings details of Self Help Groups in villages through tablet. To date, 1500+ SHGs are boarded on mobile phones and tablets. SEWA is progressing to enhance the loan repayment module within the same application. Using the app is said to have reduced cost, effort, and time significantly.

ERP - ERP named RUDI Sandesha Vayavhar was introduced to manage the live inventory and the MIS.

RUDIben Application

Figure 23. RUDI system

The application is directly linked with the ERP, where the RUDI center can also easily receive the order, and RUDIben can save a lot of traveling, time, and cost and reduce all the inventory management activities from manually to online. In the RUDI Grahak application, our urban sister can sell agro products and Food processes products such as agor and bakery and homemade snacks items directly to the customer sitting at home, managing their home, taking care of their children, and simultaneously emerging as a micro-entrepreneur.

For SEWA, it is evident that the digitalization of their services (financial and extension) has yielded tremendous positive outcomes at the individual level and organizational levels. Some of the things we can learn from SEWA's experience is the importance of linking digitalization and the organization's mission. For example, digitalization has helped them achieve their objective of inclusion. Moreover, digitalization has made the work of women more efficient and effective. It is also noteworthy that digital tools/platforms and digitally-delivered services are using the local language, which is crucial to attracting farmers to use digital advisory services.

C. Lao Farmer Network (LFN)

Lao Farmer Network is currently developing an app called LFN mart to link its members to the market. LFN has engaged an app developer for this. One of the challenges they have expressed is the profiling of their members. This takes time because they have to list all the farm products for each farmer.