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DIGITAL AGRICULTURE — HOW CAN WE MAKE IT WORK?

INTRODUCTION

Modernization and industrialization are two goals of the ONE DA, a holistic approach to agriculture and fisheries transformation. Digital Agriculture that harnesses the potentials of Information and Communications Technologies (ICTs) is among the key strategies toward modernization. It is a laudable choice considering that ICT contributions to agriculture are paramount. It has been demonstrated in many ways, such as plant clinics equipped with web-based applications for disease diagnosis, sensors for crop growth monitoring, and mobile phones for dairy and goat-rearing farmers (Koshy *et al.*, 2018; Rajkumar and Anabel, 2018; Thamizoli *et al.*, 2018). Locally, PhilRice has launched the Leaf Color Chart (LCC) app, which can assess the rice crop's nitrogen status. The LCC app is now available in Google Play Store (Philippine Information Agency, 2020). Other DA-PhilRice-developed ICT-based applications include *e-binhi*, *e-damuhan*, *AgriDoc* and many others. The DA has also developed an ICT-based trading platform.

KEY POINTS

- There is a need to devise strategies to ensure that farmers suffering from information and communications technology (ICT) anxiety may be able to optimize the benefits of ICTs. ICT anxiety is the feeling of discomfort when in front of ICTs (e.g. computers). It is common among old people, which typifies the majority of farmers in the Philippines.
- Results of the 2016-2017 Rice-Based Farm Households Survey note that while ICT access of farmers is high at 93%, the percentage of those who use ICTs as tools in their rice cultivation is only 31%.
- The Infomediary Campaign, a youth engagement in agriculture initiative of DA-PhilRice, was implemented to help address ICT anxiety among farmers. The idea was for high school students coming from rice-farming communities to help access information for farmers.
- The Campaign resulted in close to 20,000 inquiries sent by more than 4,000 student-texters (infomediaries) nationwide. Instances of technology adoption were noted in the project sites.

ICT for Development (ICT4D) literature, however, has it that a number of issues must be dealt with. Among them are ICT illiteracy, low level of formal education, and anxiety (Meera *et al.*, 2004). This is true in rice-farming communities in the Philippines given that most of our farmers are aging, according to the 2016-2017 results of the Rice-Based Farm Household Survey (RBFHS). It is feared that while the world advances to embracing new forms of technologies, the gap between the haves and have-nots may even widen.

This issue of the *Rice Science for Decision-Makers* seeks to unpack some ways in which we could make digital agriculture more inclusive. This is a proactive policy brief in light of the Mandanas Doctrine, which is set to take effect in 2022, and the Province-led Agriculture and Fisheries Extension System (PAFES) of the DA. The Doctrine devolves more functions, services, and facilities to the local government units even as it remarkably increases their Internal Revenue Allotment (IRA). The PAFES, on the other hand, makes a province as an agricultural extension “hub that synchronizes agricultural plans and programs and orchestrates the various stakeholders (DA, municipal/city government units, state universities and colleges, the private sector, NGOs, and community-based organizations)” (DA, 2021). Both of these immensely impact the reconfiguration of the Philippine agricultural extension system. This policy brief seeks to answer the question: how do we ensure that ICT serve the interests of all farmers, young or old, rich or poor?

BASIC ICT PROFILE OF THE FILIPINO RICE FARMERS

Results of the 2016-2017 RBFHS notes that their access to mobile and smart phones, and the Internet is quite high at 93%. The same percentage of households have members who know how to use the Internet. In terms of their willingness to avail of information, 93% of farmers prefer receiving them through text messages; 74% through the Internet. These results are far more encouraging than earlier studies that saw significant information poverty among farmers in five top rice-producing provinces (Manalo *et al.*, 2010).

High access to ICT, however, does not necessarily equate to high usage. The same RBFHS results note that only 21% of the respondents had attempted to acquire information on rice through the Internet; 31% through text. Why the dismal percentages if accessing information online or through text messaging is said to be the easiest and cheapest mode?

Past research has uncovered several ICT-related issues, like ICT anxiety or the feeling of discomfort when in front of computers or any ICT (Brosnan, 1998). This phenomenon has been observed mostly in older populations although other studies have also seen cases among young people (Manalo *et al.*, 2016). Among the main causes of this phenomenon is low level of exposure to ICTs, which could be due to low ICT literacy or lack of interest to learn how to use digital technologies (Meera *et al.*, 2004; Nyce and C., 2009). Aside from ICT anxiety, it could also be surmised that farmers prefer interpersonal communication as evidenced by their high preference for their co-farmers as sources of information. Rice farming, after all, is a social endeavor. Given this situation, how then could farmers stand to benefit from ICTs?

A POTENTIAL SOLUTION

One of many ways to answer the question above is by mobilizing infomediaries. Infomediary is a portmanteau of two words—information and mediation. Hence, infomediaries are people who can help mediate access to information (Manalo *et al.*, 2016). This policy brief introduces an infomediary as a person who can help someone access the computer or any ICT tool in agriculture. Mobilizing infomediaries addresses the digital divide, which is a major issue in ICT use globally. Digital divide is when there are segments of the population that cannot stand to benefit from ICTs (Warschauer, 2003). It is a huge concern that spans beyond access to ICT infrastructure. Scholars argue that it includes issues relating to socioeconomic status and level of formal education (Quibria *et al.*, 2002; Warschauer, 2003). There are two types of infomediaries: lay and paid (Abrahamson and Fisher, 2007; Gould and Gomez, 2010). Lay infomediaries perform the role voluntarily while paid or professional infomediaries do it with a fee.

THE INFOMEDIARY CAMPAIGN OF DA-PHILRICE

From 2012 to 2017, the Institute initiated and implemented the Infomediary Campaign participated in by more than 200 high schools, mostly technical-vocational schools (Manalo *et al.*, 2016). It aimed to mobilize high school students to serve as infomediaries for their farmer-parents or for any farmer in their respective rice-farming communities (Manalo, 2013).

RESULTS

Being an infomediary was manifested through searching and sharing of information. Figure 1 shows that as of 2016, close to 20,000 inquiries were sent by more than 4,000 student-infomediaries to the PhilRice Text Center (PTC) (PhilRice, 2017).

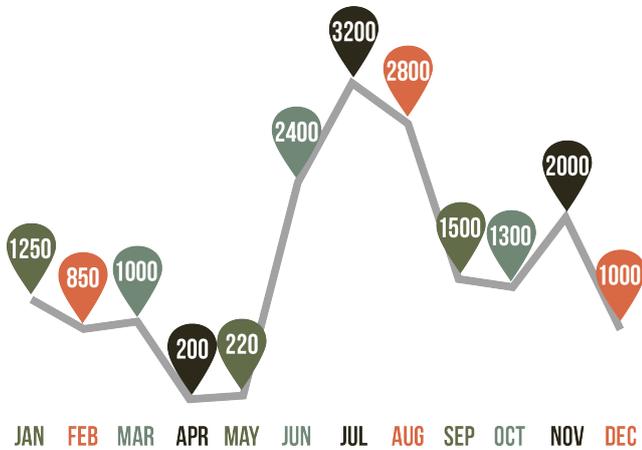


Fig. 1. Number of text messages sent by the students to the PTC from 2012 to 2016.

These students asked questions on varieties (54%), general information (27%), pest management (12%), nutrient management (2%), and crop establishment (2%) (Manalo et al., 2017). A handful of them asked questions on prices to ensure that they get the best price for their family’s produce.

The students did not keep their learnings to themselves. For example, 2016 data of the Campaign on the types of climate change-related information shared by the students show a high level of sharing vis-à-vis lessons that were taught to them (Figure 2). Students shared information they learned from PinoyRice, which is an information portal on rice being maintained by PhilRice.

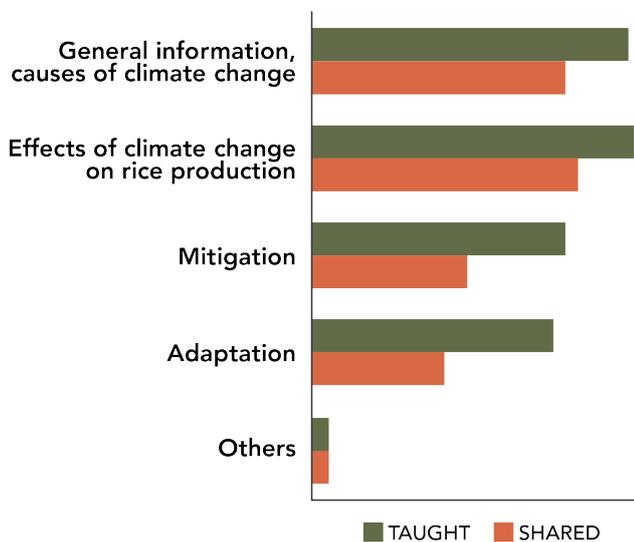


Fig. 2. Information shared by the students vis-à-vis those that were taught to them.

In addition, the Campaign noted up to third order of sharing of the lessons taught to the students (Manalo et al., 2015). That is, from the information that the students shared to their farmer-parents, the farmer-parents also shared the same information to their co-farmer, and the co-farmer also echoed the same information to at least one other farmer. Manalo et al. (2015) showed how the Infomediary Campaign was able to influence the information-seeking behavior of farmers in Tacurong City, Sultan Kudarat by showing the before, during, and after situation of their sending of messages to the PTC. Figure 3 shows that farmers developed the habit of texting the PTC to ask for ways on how they could better cultivate their rice crop. As of this writing, there remain some “infomediary texters” (now working or are in college) asking questions in the PTC.

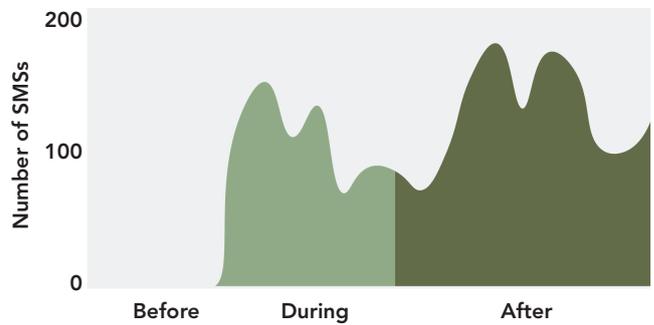


Fig. 3. The number of text messages sent by farmers in Tacurong City, Sultan Kudarat before, during, and after Campaign implementation.

The Department of Agriculture served as the main partner of the Campaign. DA-Regional Field Offices 3 and 12, DA-Bureau of Agricultural Research, and the Consultative Group on International Agricultural Research Program on Climate Change, Agriculture, and Food Security supported the Campaign financially.

CONCLUSION

With lessons from half-a-decade work in the Infomediary Campaign, it makes complete sense to mobilize infomediaries in the agriculture sector. It is a mechanism that would address information poverty among the information-poor stakeholders in the agriculture sector. Infomediaries may also serve as catalysts of change toward embracing ICTs and optimizing their full use by farmers who may be afflicted with ICT anxiety. Mobilizing infomediaries is one of many ways through which Digital Agriculture can be made more inclusive. While this issue focuses on the experience of DA-PhilRice involving high school students as infomediaries, it should be emphasized that anyone can be an infomediary. It is just wise to start with young people given their tech-savvy nature.

CALL FOR ACTION

- **Integrate agriculture-related lessons in high school curriculum.** This would open opportunities for conversation and action among young people about the importance of agriculture in their lives. Aside from integration, it is also a must that teachers pay attention to more interactive teaching pedagogies as shown in the Infomediary Campaign (Manalo *et al.*, 2017). Realizing the importance of agriculture and, by extension, the ways in which they could contribute to improving its practice is key to harnessing their potential as infomediaries.
- **Expand the infomediary initiative in state universities and colleges (SUCs) with agriculture and related courses.** Given the four-fold goals of SUCs of instruction, extension, production, and research, their students could very easily serve as infomediaries in their immediate communities.
- **Intensify the inclusion of ICTs in agriculture module in the training of agricultural extension workers and farmers.** There is a need to continually improve the offering of modules on the different forms of ICTs that are being used in agriculture, either they be from the private or public sector. Being aware that these technologies do exist is the first step to enticing farmers to consider trying them out.
- **Hire agriculture graduates or K to 12 finishers as professional infomediaries in the municipal agriculture offices (MAO).** There are millions of K to 12 students nationwide who could be hired as infomediaries as part of their on-the-job training. These graduates, especially if they took the Crops Production track, have the basic knowledge on agriculture and ICT that would make them effective infomediaries.
- **Train/update infomediaries on the latest ICTs in agriculture.** Should infomediaries be hired in the MAO, it is a must that they have a continuing training and/or updating on ICTs in agriculture, given their fast-paced development. The infomediaries must always be a step ahead of the people they would like to serve if they should remain relevant.
- **Tap youth organizations (e.g. school- or faith-based or even out-of-school youth) as infomediaries.** There are many youth-based organizations in the country who may also serve as infomediaries. For example, the DA-Agricultural Training Institute has an active program called the 4-H club which could also be mobilized for this purpose.

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ABOUT THE MATERIAL

Rice Science for Decision-Makers is published by the Department of Agriculture-Philippine Rice Research Institute (DA-PhilRice). It synthesizes findings in rice science to help craft decisions relating to rice production and technology adoption and adaptation. It also provides recommendations that may offer policy triggers to relevant rice stakeholders in search of opportunities to share their knowledge on rice-related products.

The articles featured here aim to improve the competitiveness of the Filipino rice farmers and the Philippine rice industry through policy research and advocacy.

This issue explores how digital agriculture could be made more inclusive. This is with reference to the issues relating to ICT use by the aging population such as ICT anxiety or the feeling of discomfort when in front of ICTs (e.g. mobile phones or computers). Mobilizing high school students to server as infomediaries or information providers in their respective rice-farming communities is offered as a potential solution.

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