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Hypothesizing ICT4D in Philippine Agriculture: Deriving from Trends, Setting Directions

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ABSTRACT

The yield gap in rice production can be narrowed by improving farmers' access to information. In recent years, the Philippines has witnessed a profusion of information and communication technology (ICT) interventions expected to increase Filipino famers' access to rice farming information, led by the PhilRice Farmers' Text Center. Despite these initiatives, the digital divide further excludes the marginalized. Drawing from literature on ICT for development (ICT4D) and recent trends in Philippine ICT, this paper proposes policy directions that can be pursued by the agriculture sector for more relevant ICT interventions (i.e., making technology generation participatory, marrying of disciplines, exploring technological hybrids, focusing on critical evaluation of ICTs, and tapping farmers' children as infomediaries). It is essential to engage farmers in various stages (i.e., from design to evaluation) of ICT initiatives to maximize the impact of ICTs on their lives and to avoid the misdirection of ICT interventions.

INTRODUCTION

The Philippines has ingeniously benefited from information and communication technologies (ICTs), particularly the mobile phone, despite being confronted with challenges in access and multiple divides (i.e., digital, social, or generational). In recent years, the country has developed ICT for development (ICT4D) applications including e-governance, e-health, and e-education. ICT4D scholars refer to the abundance of such applications as a move towards e-everything.

The mobile phone is perhaps the most significant among available ICTs. The Philippines remains the texting capital of the world, with Filipinos sending an average of more than 2 billion text messages daily in 2009 (National Telecommunications Commission 2009 in Iglesias 2010). This scenario is conducive for the telecommunication giants of the country; for one, the Philippine Long Distance Telephone Company (PLDT) reported a net income of PHP 41 billion in 2009 (Reyes 2010).

The agriculture sector has been utilizing ICTs in its operations. The Open Academy for Philippine Agriculture (OpAPA) leads the roster of projects being implemented nationwide along with e-agrikultura (e-agriculture) and the Farmers' Information and Technology Services centers. From 2006 to 2009, the Farmers' Text Center (FTC) of PhilRice reported an unprecedented count of 70,000 text messages (PhilRice 2010). The FTC is a platform to expand information dissemination to and among farmers. Nationwide, OpAPA has cyber-communities to provide Internet access to Filipino farmers, with varying degrees of success. Videoconferencing, where rice experts in the PhilRice Central Experiment Station communicate with farmers in distant provinces (Manalo et al. 2009); and the Pinoy Rice Knowledge Bank, which contains information that farmers should know about rice farming (Pinoy Rice Knowledge Bank 2010), are useful initiatives expected to help farmers augment their rice yield.

Amid the reported success of ICTs in the agriculture sector, a number of issues should be resolved to optimize such technologies. This study explores prevailing trends in ICT for agriculture and presents some recommendations for ICT4D in Philippine agriculture.

The Techno-savvy Filipino

The Philippines and other developing countries continue to surprise ICT4D intellectuals. These countries have low investment in ICT infrastructure yet they benefit immensely from ICTs. This phenomenon has prompted scholars to revisit the prevailing conceptions on e-readiness,[1] since measures are often based solely on the level of investment in ICT infrastructure in each country such as the number of computers per 100 people (James 2004). Hypothetically, countries with low scores on e-readiness are said to benefit poorly from ICT. In reality, this is obviously not the case. In the Philippines alone, the sharing mechanism[2] has made it possible for many individuals to benefit from ICTs even if they do not own a mobile phone (James 2004).

Meanwhile, the mobile phone has become a primary commodity in the Philippines. Mobile phone expenditure covers a huge chunk of the budget of a Filipino family, rich or poor (Verzola

1 The degree to which a community is ready to participate in the digital economy (Bhatia 2001)
2 The sharing of a mobile phone within a family (James 2004)

2009). The poor segment of the population has therefore created a large market in the mobile telecommunications industry (Sebastian 2005).

With the proliferation of cheap mobile phones in the market, Filipinos have also upgraded their units to some of the latest models, which are usually Internet-ready. Mobile phone charges are relatively cheap and continue to become cheaper as new players join the market. In fact some scholars argue that phone call and short message service (SMS) charges should cost even less, and that poor consumers are subsidizing rich subscribers in the present set up of the Philippine telecommunications industry (Verzola 2009).

Nonetheless, there are now more ways for most Filipinos to connect to the Internet as ICTs are starting to penetrate the country's remotest areas. There is also a surge in the use of broadband Internet as well as the availability of Wi-Fi access in many public areas—from restaurants and bars to public utility buses.

In sum, the Philippines is home to abundant ICT4D applications and is thus in a good position to make use of ICTs. The questions that remain are (1) how successful have ICTs been in addressing issues related to digital divide? and (2) what are the future directions in ICT for agriculture in the Philippines?

Multiple Divides

Digital divide, or the inability to participate in the digital exchange of information, is not just an issue of access. As ICT4D scholars have pointed out, digital divide encompasses a number of issues spanning technological to social aspects (Unwin 2009). While ICTs have the power to include every citizen, they also have formidable exclusionary power if and when multiple divides are not addressed.

In the Philippines, many social issues hinder farmers from taking full advantage of ICTs. First, most farmers have not finished formal education, which has significant impact on their literacy (Manalo et al. 2010). This is troubling as most texts in cyberspace are in English. If one talks of reaching them through mobile phones, the same problem holds as SMS is text-based, which will not sit well with illiterate farmers. Second, the country has an aging population of farmers (Manalo et al. 2010). In ICT4D literature, old age and low level of formal education are among the causes of low reception towards ICT interventions (Taragula and Gelb 2005; Meera, Jhamtani, and Rao 2004; Klimaszewski and Nyce 2009). Third, most old people have ICT anxiety[3] (Jegede et al. 2007). Fourth, time (Malasa et al. 2007) and money (Manalo et al. 2010) are two equally important concerns. Most farmers, given their busy daily schedules, could not find time to learn how to operate a computer. Some farmers find it expensive to recharge their mobile phones for sending text messages. Fifth, most farmers do not see the relevance of ICTs in their lives. One of the points raised by farmers is that if they were able to farm for decades without the help of ICTs, why would they need them now? Studies have shown that only those who can realize the benefits of ICTs will spend time learning how to use them (Taragula and Gelb 2005; Gelb et al. 2005). Lastly, it can be surprising to note that even farmers with computers and Internet connection at home do not use them to search for information on improving rice yield, nor do they ask others to do it for them. Their computers are usually for their children (Manalo et al. 2010).

Aside from social factors, infrastructure is also a concern. There remain some areas in the country where there is no electricity or where

3 The feeling of discomfort towards new technologies

electricity is intermittent because of avoidable or unavoidable circumstances such as armed conflict. In an e-readiness study, Manalo et al. (2009) reported that farmers in Maguindanao did not have electricity for two months following the encounters between the military and the rebels in the area.

What can be derived from the factors mentioned above is that digital divide is multifaceted and may remain a dilemma if not properly addressed.

James (2004) has pointed out that digital divide in developing countries could be decreased, if not eliminated, with the use of mobile phones. This is related to the digital provide[4] concept forwarded by Heeks (2008), which states that those who do not have access to ICTs could still benefit from them by virtue of their affinity to others who do have access to such technologies. This is being practiced in the Philippines, especially in rural areas (e.g., a parent without a mobile phone pays somebody who owns one to contact his or her child who works in the city; a farmer asks his or her child to send a text message to the FTC). While these mechanisms are in place, there is a scarcity of studies to measure their impact and to what extent they benefit those without direct access to ICTs.

The Move Towards "ICTs with Moral Agenda"

Unwin (2009) quoted German philosopher Jurgen Habermas: "Technology has all too often been used mainly to enable the rich and privileged to retain their positions of economic, social, and political power." Taking off from this view, Unwin (2009) asks how exactly things can change so ICTs could be used for the benefit of the poor and notes that ICT4D is ICTs with moral agenda.

There are various theoretical approaches and actual implementation strategies for dealing with multiple divides. Such approaches and strategies include (1) making technology generation participatory, (2) marrying of disciplines, (3) exploring technological hybrids, (4) focusing on critical evaluation of ICTs, (5) and tapping farmers' children as infomediaries.

Central to the analyses that will be done in this section are the diagrams of the ICT4D value chain (Figure 1) and the changing interest in the area of ICT4D (Figure 2). The value chain covers the key areas in ICT4D: readiness, availability, uptake, and impact (Heeks 2010). Readiness refers to the key ingredients in ICT interventions such as infrastructure. It is said that the infrastructure stage is the first phase towards an e-ready society. Availability refers to deliverables such as the establishment of an Internet access point or a telecenter. Uptake refers to "the processes by which access to the technology is turned into actual usage" (Heeks 2010 p. 627). Impact refers to the contribution of ICTs to broader development goals.

Toward the end of Figure 1 are exogenous factors, which include culture and other social considerations, that were not given much attention in the past. At present, however, interest in these factors is increasing as scholars begin to question the social impacts of ICTs. This is illustrated more clearly in Figure 2.

Heeks (2008) refers to the interest in the social aspect of ICT4D as ICT 2.0, with ICT 1.0 being the time when consumers were forced

4 Digital provide refers to how farmers who do not have access to ICTs benefit from others' access to it through the sharing of information among them. A case of fisherfolk in India would illustrate this. Fisherfolk who did not have mobile phones were informed by those who had mobile phones of the prevailing selling price for their goods. That way, they did not have to suffer from ambulant buyers who would purchase their goods at prices below the minimum.

Figure 1. The ICT4D value chain (Heeks and Molla 2009)

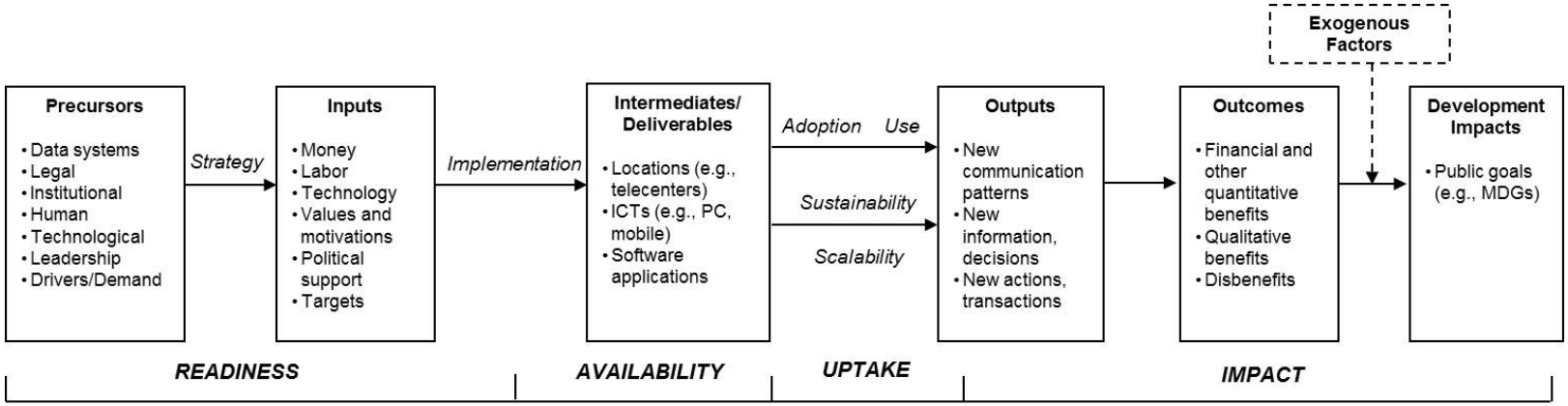
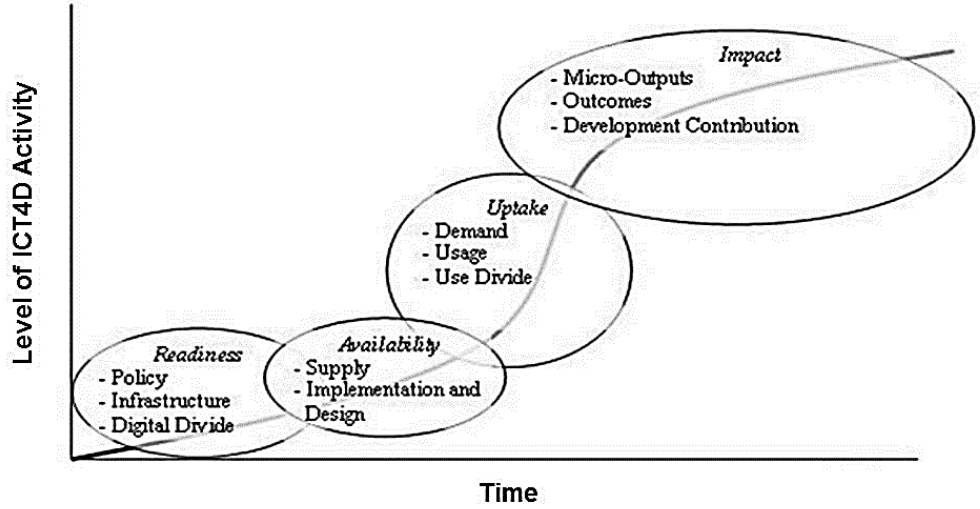


Figure 2. ICT4D over time (Heeks and Molla 2009)



to use whatever technology was available; and notes that ICT 2.0 is the time to ponder how the poor can benefit from ICTs. He highlights four key points in justifying the need for ICT 2.0. First, there is a moral side to it. For the longest time the informatics sector has been designing technologies that cater exclusively to the rich population for the basic reason that the money is there. According to Heeks, it is high time for the sector to think of how to address the issues of the poor. Second, there is a regional enlightened self-interest; the issues that the poor communities are experiencing now might be the same issues that the middle class or even the rich will face in the future. Third, there exists a self-interest among programmers in which it is more thrilling to design applications that will benefit the poorest communities than those that would cater to wealthy ones.

In the Philippines, there might be a need to investigate the extent to which ICT 2.0 is being observed. Filipino ICT4D scholars could endeavor to come up with an inventory of ICT applications that adhere to "ICTs with moral agenda." Suppose this were possible, scholars should pay close attention to the process of technology generation rather than the product itself. According to scholars, the point of ICT4D is not merely to come up with the grandest technology but to develop tools and methods that are advantageous to the intended users (Zanello and Maassen 2011). In other words, there is a call towards user-centered studies in the development of ICT applications in Philippine agriculture. The key question is how farmers can stand to benefit from ICTs being developed. This query presupposes that access will not be an issue and other enablers are available.

DISCUSSION

ICT Policy Directions in Philippine Agriculture

Most of the policy directions in this section are extensions of the analyses of Heek (2008) in his paper, *ICT4D 2.0: The Next Phase of Applying ICT for International Development*. Some input from the study of Manalo et al. (2009), *Assessment of E-Readiness of Five Top Rice-Producing Provinces in the Philippines*, are also included.

The participatory approach

The growing interest in the social dimension of ICT4D is prompted by the fact that most ICT4D initiatives are driven by supply rather than demand (Unwin 2009). This means that said applications or interventions are made possible, even without request from the community, because resources are made available to them. In many ways, this supply-driven approach has resulted in misdirected interventions and, in most instances, very expensive failure (eGov for Development 2010). Hence, it would be favorable to use the participatory approach in ICT4D. The intended beneficiaries must have a say on the design and the kind of ICTs that will be developed. In most projects, participation is often limited to community consultations for a project that has already been completed. Chambers (1997) mentioned that "participation by the poor is not only in the design and implementation phases of projects but also in identification, monitoring and evaluation, and policy formulation."

Looking at the baseline information is one way of observing the participatory approach. Take the case of the farmers' information-seeking behavior in the e-readiness study by Manalo et al. (2009). Apparently, lectures and

print publications were the farmers' preferred modes of information delivery (Figure 3). The farmers emphasized that in lectures, they could ask questions instantly. They also noted that with print publications, they could always review concepts that were unclear to them initially. In the 2009 study, the online mode of information delivery lagged behind lectures and print publications. This result can be attributed to the farmers' lack of computer know-how. This and other pertinent details will continue to be overlooked if and when baseline information is disregarded.

Marriages among disciplines

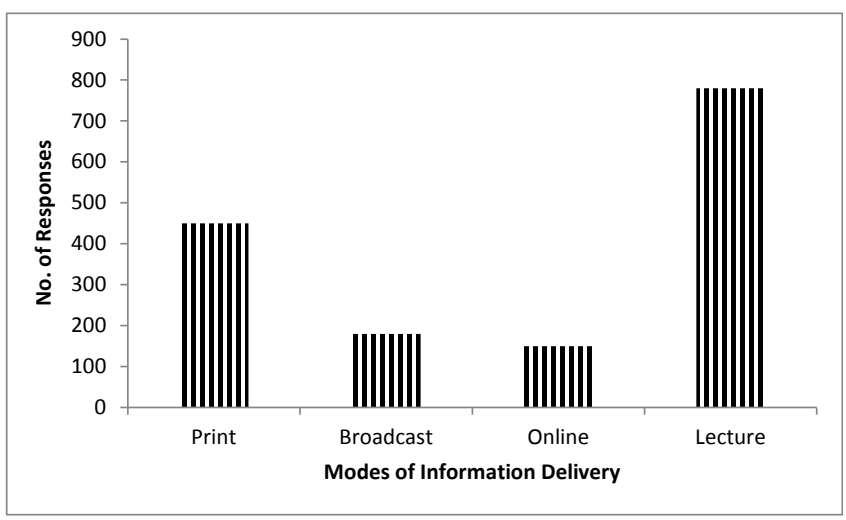
Synergy among professionals from different fields (e.g., programmers collaborating with people from the social sciences) is desirable. Heeks (2008) refers to this combination as development informatics. In ICT4D literature, it is known that gaps in one discipline can be filled in by another discipline. It is therefore sensible to have marriages among these technical and behavioral disciplines to achieve a more holistic outcome. It is the time when programmers, instead of being left alone to design applications that only satisfy their curiosity and inventiveness, should be guided by the actual needs of the intended users. This move is consistent with the increased interest in the social aspect of ICTs. Occasionally, this can prove challenging in a bureaucracy where people from different disciplines have different priorities.

Technological hybrids

Aside from disciplines, marriages among media or technological hybrids are also sought. Mobile phones with Internet access are a good example of this technological convergence. Though such phones are currently expensive, technology developers are responding to persistent calls for more useful and innovative technologies; and based on trends, prices of these technologies are expected to drop once upgraded versions are developed.

Technological convergence is not limited to new ICTs such as the Internet and the mobile phone. Marriage between old and new media such as the radio and the Internet is also important (Heeks 2008). This can be explored perhaps in the context of upland farmers,

Figure 3. Farmers' preferred modes of information delivery (Manalo et al. 2010)



since Internet connectivity is still a challenge in upland areas. The radio remains the most suitable medium when reaching people in far-flung locations. This would even be a sound intervention considering the radio's ability to transcend illiteracy combined with the wealth of information that can be derived from the Internet. In the Philippines, 90 percent of the population has access to radios (Geovisual Solutions Inc. 2008) while only 6 of 100 people have access to the Internet[5] (Librero and Arinto 2008). Successful inclusion of the marginalized in the development process requires focusing more on audio- and visual-based and "idiot-proof" technologies. These technological hybrids reinforce the idea that old media still have a place in a "wired" world.

Given the above discussion, Filipino ICT4D scholars might want to explore the usability and effectiveness of combined media in relaying information on agriculture. A primary consideration is how information packaging will be different should several channels be combined. For communication scholars, it might be helpful to look at the potential of different media to support one another's existence. For instance, looking at the usefulness and impact of radio should it be combined with the Internet or vice-versa in the agricultural context. Also, in light of the discussion of the widening coverage of the Internet, scholars might want to validate its progress in the remotest areas. Some considerations are (1) the extent to which the Internet has saturated rural areas; (2) the length of time it would take for the Internet to fully saturate the remotest areas; (3) the possible impact of the Internet on Philippine agriculture; and, (4) as far as relaying agricultural information is concerned, the likelihood that the Internet can do its job alone.

Critical evaluation of ICTs

There is a pressing need to critically evaluate the impact of ICT4D projects—ongoing (process evaluation), already done (post hoc), and about to commence (pre hoc) (Heeks 2010). Heeks and Molla (2009) listed the 11 most common forms of evaluation that can be used in assessing impacts of ICT4D projects, including Amartya Sen's capability approach and livelihood approach. It should be noted that most of these approaches are qualitative in nature. According to Heeks (2010), it is high time for governments and all agencies involved in ICT4D to account for their ICT spending. In recent years, governments of developing countries have been spending billions of money for ICT projects believing that ICTs will be their roadmap to becoming a developed country (Heeks 2010). Many of these countries have applied for loans from supranational institutions (e.g., World Bank) to make ICT infrastructure available, and this may have disastrous consequences as shown by the experiences in structural adjustment programs (SAPs) when countries are not able to pay their debts on time.

For FTC, an SMS platform that receives close to 100 text messages daily, process evaluation[6] might be useful. Given that there is an increasing and continually rising number of text message senders (texters), some evaluation questions worth asking are:

1. Who are the texters?

5 Presently, the figure may be higher with more Filipinos having access to broadband Internet and Wi-Fi services in many areas.

6 Process-based evaluation is an effective tool for highlighting improvements in program operation, generating further knowledge, and estimating cost and resource efficiency (Unrau et al. 2007).

2. What are the mechanisms of the project to ensure that the service is known in the most disadvantaged areas?
3. What are the mechanisms to manage the increasing demand for the service in terms of manpower and technological aspects?
4. To what extent does the project have a mechanism to reach illiterate and disabled farmers?
5. What is the mechanism in place to track how the farmers use the information that they have received from a text center agent?
6. The Philippines has more than 2 million rice farmers. Why are the other farmers not texting?

In relation to critically evaluating impacts of ICTs, scholars are also calling for more studies that would examine ICT4D in the context of social capital and manifestations of digital provide.

Lastly, ICTs have created an impression that they are costly and require billions of money to be realized. Hence the question, do ICT4D initiatives always have to be expensive? Costs may be high when certain elements are lacking during the infrastructure phase, when the fundamentals have to be put in place (i.e., when basic infrastructure such as telephone lines are installed yet under-the-sea cables are absent). However, when the community is already connected, the price for ICT4D initiatives need not be steep as long as technological know-how, resourcefulness, and creative imagination are present. The pilot-testing of the online campaign on rice production, where freeware such as Skype and Yahoo Messenger were used illustrates this (Manalo et al. 2009).

New infomediaries: The farmers' children

The role of the farmers' children in bridging the digital divide is a crucial aspect that should be explored (Manalo et al. 2010). As common users of online social media such as Facebook and Twitter, the children can convey the benefits of ICTs to their parents. For one, these children are computer literate, with the assumption that they have been taught how to use a computer in school or they have learned it somewhere else. Second, these children frequent computer shops, which means that they have regular access to the Internet. Creative applications are needed to reach the farmers' children—applications similar to *Farmville*[7] but are localized to capture local realities. Facebook, which hosts countless online community groups, can also be a venue for online community groups for farmers' children.

A good question posted by Manalo et al. (2009) is the willingness of the farmers' children to search rice farming information for their parents, which scholars might be interested to conduct an experiment on. For instance, since some children will be exposed to information hubs on rice farming (e.g., PhilRice website), researchers can observe them for a certain period. The researchers could then explore what the farmers' children will do with the information they have obtained. This study will be very informative especially in terms of the effectiveness of the farmers' children as infomediaries, and partly in evaluating the social impact of the role these children will perform. A closer look on how the youth negotiate their private and public spaces will be helpful in drafting policies on how they can be engaged in rice farming.

7 A social network game played on Facebook that simulates farming practices

CONCLUSION

It has long been argued that the purpose of ICTs is to serve the interests of the poor and marginalized. The key point being conveyed in this paper is to determine how farmers can and will directly and indirectly benefit from ICTs. It is imperative that they be given a voice in the process of developing ICT applications that will be useful to them. It is only by involving farmers that ICTs will become more relevant and therefore create a strong impact in their lives. The point of ICT4D is not merely to come up with the grandest technology but to develop tools and methods that are useful and applicable in the agricultural efforts of Filipino farmers.

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