

ACCESS AND UTILIZATION OF ICTS BY FARMERS IN COASTAL AREA OF RURAL YOGYAKARTA INDONESIA

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A B S T R A C T

Information and Communication Technologies (ICTs) or commonly referred as electronic media or cyber media has been acknowledged play pivotal role in the development process. ICTs as a new instrument could facilitate the need of new information and innovation for rural people or farmers. Several studies reported that extension and communication based-electronic media in developing countries encounters more hindrances rather than in developed countries. However, the application of ICTs is substantial to be strengthened by considering their potency and prospect for supporting various activities of villagers. This paper discusses the access and utilization of ICTs by farmers in rural Yogyakarta for supporting daily life activities including agricultural activities. The geographical conditions and socio-economic characteristics of farmers in rural Yogyakarta were considered as the influenced factors on ICTs usage either for daily live activities or farming activities. Research method of the study was descriptive method which has been conducted by mixed method. In general, farmers have been using electronic media such as television, radio and hand phone with function for entertaining, education and getting new information. Information gathered from ICTs includes social, cultural, economic, health and environmental issues. The use of internet via hand phone has newly started to be utilized among farmers in coastal-marginal farming area who intensively engaged in horticulture crops cultivation mainly for getting and exchange the market information. Information on agriculture which accessed by farmers was still dominated by technological innovation of production aspects.

INTRODUCTION

The use of mass media for information delivery related to agricultural development has been gradually increasing. The use of printed media, such as magazines and newspapers, widely spread across farming communities. Furthermore, the penetration of electronic media, such as cyber extension (extension through information technology media; also called ICTs), has expanded greatly. To some extent, the function of printed and electronic media has overcome the backwardness of technology by focusing on agricultural information and innovation dissemination.

ICTs for agriculture are widely understood to include the use of radios, televisions, audio recordings, video recordings, telephones, the internet, and mobile phones or mobile phones to deliver various agricultural information [Khan, et.al, 2010 and Khan, 2013].

The Ministry of Communication and Information of the Republic of Indonesia [2015] shows that, at a national level, ICT access and ownership by farmers has been considerably high for television (82.3%) and mobile phones (64.8%). As for other media, a radio was owned by 12.8% of the respondents, and access to the internet was still relatively low (8%). A study on information access for farmers in rural Central Java noted that the use of electronic media, including the internet, as a source for farmers' knowledge in farming activities has still been limited [Guntoro, Subejo and Sazali, 2016].

While from a global perspective, the prospect of ICTs for agricultural development is important, the fact remains that only a limited number of farmers are able to access electronic media. People in some remote areas in Indonesia are not supported by appropriate ICT infrastructure and have low levels of access to cellular phone and internet connections, broadcast networks (for television and radio) and even electricity [Subejo, 2016].

To access important information via electronic media, farmers need tools, such as a television, computer, radio, mobile phone, smartphone or other media devices, which are considered relatively expensive. In some cases, farmers who have occasional access to the media are unwilling or unable to utilize it. Electronic media is mostly used for entertainment and has a lesser impact on enhancing the knowledge, attitude and behavior of farmers to support their farming productivity.

Since only a limited number of studies on ICT access in rural Indonesia exist, research on the access and utilization of ICTs by farmers in rural Yogyakarta, Indonesia that considers the differences in geographical conditions, socio-economic characteristics, literacy rates and skills of the farmers on their ability to access and use media for agriculture, will be important. Furthermore, this research aims to investigate the access and utilization of ICTs for supporting the daily life of farmers in coastal area of Kulon Progo District, Yogyakarta that to some extent has been referred as marginal area.

Kulon Progo district as one of the autonomic district in Yogyakarta Special Region has plenty of coastal sandy farming lands, especially in Panjatan sub-district. In general, coastal sandy farming lands in Kulon Progo locally known as common resources which belong to Pakualam Ground (abandoned land which belongs to Yogyakarta royal family), and rural farming households directly manage the access to land resources. Various efforts in coastal sandy farming land are undertaken to increase income of coastal communities. Started from 1980s, thanks to pionering initiative actions and innovations of the several farmer leaders, marginal land in coastal area can be managed into productive farming land for various agricultural production.

MATERIALS AND METHODS

The research was conducted in coastal-marginal area of Bugel Village, Panjatan District, Kulon Progo Regency. Informants of the research consisted of a community leader, a farmers' leader, and several members of the farm community based on their access to information and their experience in developing agricultural production in each area. An in-depth interview was performed in the community with farmers and community leaders to determine more specific data in the surveyed area. The interview session was undertaken with 25 respondents.

The basic method used in the research is descriptive analytics. Neuman (2009) argued that the descriptive method is a method that can be used to analyze groups of people, objects, systems of thinking, and certain classes of events in the present that are described systematically and accurately based on facts, and then the relationship characters among the phenomena can be explored.

The descriptive method used in this research utilizes qualitative and quantitative approaches, which is called the mixed method [Creswell and Clark, 2010]. The data collected were analyzed using categories, matrices and qualitative descriptions.

RESULTS AND DISCUSSION

1. General Condition of Research Sites

General characteristics of socio-economic aspects and geographical conditions including the farming pattern, area condition, cropping pattern, accessibility, infrastructure, communication network, and level of Regional Minimum Wage (RMW). The location of the surveyed site is shown in Figure 1.

Figure 1. Map of Research Site



(Source: Adapted from DPKKA DIY, 2017)

Table 1. General Conditions of the Research Site

No.	Characteristics	Description
1.	Farming Pattern	Horticulture crops and fruits
2.	Area condition	Coastal sandy land
3.	Cropping pattern	Whole of year
4.	Accessibility (distance from city center)	34 km
5.	Infrastructure (road condition)	Asphalted, some parts constructed by stone
6.	Communication Network	Well developed
7.	Regional Minimum Wage (average wage per person per year)*	IDR 1,373,600.00

* \$1 US = 12,000 IDR (Indonesian Rupiah)

In Kulon Progo, farmers' accessibility to the farming land is adequate, as the majority of farming roads are asphalt, with only a few of the farming roads constructed with stone and soil. Kulon Progo is relatively distant from the downtown (approximately 34 km). Agricultural production in Kulon Progo mostly includes horticultural crops such as chili and eggplant and some fruit crops such as watermelon and Californian papaya. The horticultural commodity prices from produce planted in Kulon Progo were, on average, higher than the price of the paddy or corn. The paddy or corn price ranged

between 3,000.00–7,000.00 IDR per kg, while the horticultural commodities, especially chili, could reach 10,000.00–60,000.00 IDR per kg.

Although the farmland in the coastal areas of Kulon Progo is classified as marginal land with low fertility for agricultural production, the hard work of the farmers in managing the coastal sandy farmland since the 1980s has converted the soil into a more productive land for agricultural activities.

Developing coastal sandy area as productive farming land has been regarded as a appropriate solution of land conversion and small size of land ownership through a long process and mechanism. Some talented farmers have started to plant in the coastal sandy farming land since 1980s. They were success to convert the coastal sandy farming land into more productive land which used for agricultural cultivation and production. Furthermore, pioneering works of innovative famers have attracted the other farmers to join in the process. The process also gave an opportunity to farmers who have little access of farming land. Then, farmers could join to produce various agricultural crops in coastal sandy farming land. A team of researchers from Universitas Gadjah Mada (UGM) calls the process is as ‘open access’. Historically, open access of coastal farming land has been practiced by local farmers since 1985. Farmers have started to grow chilli and the other horticulture crops such string bean and other vegetables.

2. Characteristics of Farmer Respondents

The characteristics of the farmer respondents encompasses age, formal education, farming experience, and farming household income. The description of each characteristic of the respondents is presented as follows.

Age. Productive age is divided into the following three categories: 1) highly productive (15–49 years old), 2) productive (50–64 years old), and 3) non-productive (under 15 years old and over 65 years old). In the Kulon Progo Regency, 68% of respondents were categorized as 31–50 years old. A better generation of farmers are present in the coastal area of Kulon Progo. Since it was established in the early 1980s, the agricultural land has plenty of coastal sandy farmland that is being managed by the second generation (farmers between 31–50 years old), so one could suggest that the farmers’ regeneration in this area was quite successful.

Formal Education. The extent of a formal education for the farmers in Kulon Progo was high school. In Kulon Progo, 56% of the respondents were high school graduates. Moreover, 4% of the respondents in Kulon Progo graduated with a diploma.

Farming Experience. 60% of the farmers in Kulon Progo had only 0–20 years of farming experience (and, thus were a young generation of farmers).

Farming Household Income.

income above the RMW at IDR 1,373,600.00 per month. The highest

household income in Kulon Progo reached IDR 10,000,000.00 per month, and the lowest income was IDR 1,000,000.00 per month. Due to the higher income, these farmers could possibly fulfill primary, secondary and even tertiary needs.

3. Media Ownership by Farmers

Media ownership by farmers, including electronic and printed items, refers to the media owned by farmers (bought by farmers rather than lending or accessing it from others). Electronic media is referred to as several types of electronic hardware, such as televisions, radios, mobile phones, smartphones, the internet via a PC or laptop, and VCDs or DVDs, and printed media is referred to as several types of paper-based media such as newspapers, bulletins and magazines. The proportion of media ownership (including electronic and printed media) to some extent depicts the farmers' access and utilization pattern for using media to obtain information and other needs for the farmers' daily life (see Table 2).

Table 2. Distribution of Media Ownership in the Research Site

No.	Type of Media	Kulon Progo (n = 25)	
		Owners	(%)
1.	Television	25	100.00
2.	Radio	15	60.00
3.	Mobile phone	20	80.00
4.	Smartphone	16	64.00
5.	PC/laptop	12	48.00
6.	CD/DVD	8	32.00
7.	Newspaper	4	16.00
8.	Magazine	2	8.00
Average		12.75	51

Based on the average media ownership in the research site, the percentage of farmers owning several electronic media, such as televisions, radios, mobile phones, and smartphones, exceeded 50%. Moreover, the majority of the farmers had more electronic media ownership than printed media ownership. The percentage of electronic media ownership, such as televisions, radios, mobile phones, smartphones, PCs/laptops, CDs/DVDs in Kulon Progo was greater than printed media, such as newspapers and magazines, which only reached 16% and 8%, respectively. Printed media (magazines in particular) had the lowest percentage of ownership in the research site.

Electronic media ownership of televisions, smartphones, and PCs/laptops in Kulon Progo was at the high proportion. In Kulon Krogo, all of the

farmers (100%) had a private television, 64% of the farmers use a smartphone, and 48% of the farmers have a private PC or laptop.

4. Functions of Electronic Media

The farmers and their household members use electronic media in their daily life for entertainment, education, and obtaining various information. The household members access the electronic media by private ownership of the media and/or by borrowing from other parties, such as friends, neighbors, relatives, or colleagues, and by accessing the media from public facilities.

In fact, not all of the farmers who have media ownership privately preferred to use the media for accessing entertainment, education, or other information. Televisions, radios and mobile phones are widely used by other household members for accessing entertainment and education. However, there is no use of electronic media for educational purposes.

Table 3. Functions of Electronic Media by Farmers

Rank	Types of Media	Usage (Person)	Owner Usage (%)	Functions of Electronic Media		
				Entertainment	Education	Information
				%	%	%
1	Television	25	100.00	40.00	0.00	60.00
2	Mobile phone	17	85.00	5.88	0.00	94.12
3	Radio	14	93.33	64.29	0.00	35.71
4	Smartphone	8	50.00	12.50	0.00	87.50
5	CD/DVD	4	50.00	100.00	0.00	0.00
6	Laptop/PC	3	25.00	33.33	0.00	66.67

The order of preferred use by farmers in Kulon Progo included a television, mobile phone, radio, smartphone, CD/DVD, and PC/laptop in their daily life. In Sleman, the order of preferred use by farmers was a television, radio, mobile phone, smartphone, CD/DVD, and PC/laptop.

In Kulon Progo, all of the farmers had a TV (100%), with 60% using the TV for accessing information and 40% using the TV for entertainment. Farmers in Kulon Progo stated that the television could provide up-to-date information that could fulfill the needs of farmers, leading to the preference of the TV over other media.

Electronic media usage for accessing various information can be categorized into several categories, including social, cultural, economic, political, health, and the environment. Table 4 describes the access and utilization of electronic media for searching for various needed information.

Description:

Table 4. Farmers' Access and Utilization of Electronic Media

Rank	Types of Media	Social	Cultural	Economic	Politics	Health	Environment
1	Television	•••	•••	•	•	••	•••
2	Mobile phone	••	-	•	•	•	•
3	Radio	•	••	•	•	•	•
4	Smartphone	•	•	•	•	•	•
5	CD/DVD	-	•	-	-	-	-
6	Laptop/PC	•	•	-	-	•	•

- = User percentage 1 - 30%
- = User percentage 31 - 70%
- = User percentage > 71%
- = No usage

Generally, the tendency for electronic media usage was for accessing information related to social and cultural issues, economics, and the environment. Topics pertaining to social issues included society life, pilgrimage to Mecca, localization issues, eviction, narcotics or liquor abuse, formal education for children, and others. Information pertaining to cultural issues included concerns for current issues such as local arts, talk shows, quizzes, films, and drama series. Information on economic issues included the current price of agricultural commodities, Indonesian exports, imports on agricultural commodities, and local economic growth. Aspects related to environmental information encompassed floods, landslides, earthquakes, bad weather, and current climate change issues.

A high percentage of electronic media usage for accessing information, especially for social, cultural, and environmental aspects, closely correlated with high social sensitivity, keeping the tradition and awareness on the environment and society.

5. Electronic Media Usage for Supporting Agricultural Production

In the daily life of farmers, they use electronic media for accessing information and for current issues related to agricultural activities. Agricultural information is categorized into the following 6 topics: 1) technical production, 2) marketing, 3) policy, 4) success stories, 5) human interest stories, and 6) financing.

Based on the rank of electronic media usage for supporting agricultural activities, several electronic media, including televisions, radios, and mobile phones, are noted as important media for farmers. The farmers assumed that the television and radio could present up-to-date information related to technical production, marketing, policy, success stories, human interest stories, and finance through various programs aired every day.

Mobile phone usage for marketing ranks higher than for technical production support. Agricultural activity based on horticultural production by farmers in Kulon Progo made farmers demand a quick transaction because

horticulture crops are naturally perishable and need to be sold quickly. The mobile phone's benefits of short message service (SMS) and phone call facility were helpful for assisting farmers in marketing horticultural products and with connecting producers with buyers.

Table 5. Electronic Media Usage Based on Agricultural Aspects (% User)

Rank	Type of Media	Production Techniques	Marketing	Policy	Success Story	Human Interest	Financing
1	Television	•••	••	••	••	•	•
2	Mobile phone	•	••	-	-	-	•
3	Radio	••	•	•	•	•	•
4	Smartphone	•	•	•	•	-	-

Description:

- = User percentage 1 - 30%
- = User percentage 31 - 70%
- = User percentage > 71%
- = No usage

However, based on the number of electronic media usage for agriculture percentage (rank 1 of 4 of every aspect), the results showed that the farmers had a higher tendency to use electronic media for accessing technical production information compared to the other aspects. Additionally, the farmers already assumed that important knowledge could be accessed via several electronic media devices. They could access new information of the farming system on the television or radio and address their problem by using their smartphone (browsing the internet) or even ask their colleagues or extension workers about their problem through a mobile phone (SMS and mobile phone).

6. Discussion

In the coastal area of Kulon Progo, the percentage of electronic media utilization for agriculture was considerably high and the high income of the farmers in Kulon Progo likely contributed to the high electronic media use. Ninety-six percent of the farmers in this area belonged to a community whose income was above the RMW.

The economic condition of farming households, to some extent, likely contributes to the electronic media ownership and utilization. Electronic media is recognized as relatively expensive, and additionally, its utilization requires an additional cost. Farming households that have a higher income from cultivated crops have a greater opportunity to fully use electronic media for supporting their farming activities.

The progressivity of the farmers, which to some extent is represented by their age and educational background, also becomes an important factor when considering the access and usage of ICTs. This study shows that 68%

of the farmers in Kulon Progo are young (aged 31–50 years old). This number was the highest compared with farmers in the two other districts. The young age enabled the farmers to access electronic media, and especially new media, easily because they possessed a broad, modern insight and have the ability to operate ICT devices.

Based on the use of media to gain agricultural information by farmers, some electronic media, such as televisions, radios and mobile phones, were regarded as the most important media. The mobile phone has been perceived to greatly contribute to obtaining information immediately and accurately. The farmers in Kulon Progo, who grow a high percentage of perishable horticulture crops, need quick and accurate information, especially for distributing and marketing. The mobile phone began as an important communication tool to facilitate the process of horticultural crop marketing. Through the mobile phone, farmers were able to access the market network. Increased use of the mobile phone by the Kulon Progo farmers was likely due to the increased economic status as a result of the cultivated commercial commodity.

In short, instead of using the television and radio as conventional electronic media, the new emerging media, especially the mobile phone and internet, became very prominent to respond to the dynamics of agricultural problems. The new media provide fast and accurate information. In the newly developed coastal farming area of Kulon Progo Regency, where most of the farmers grow horticultural crops characterized as a high risk and having a high price, the farmers have started to utilize mobile phones to exchange short messages and, to some extent, use the internet for accessing the market situation of cultivated crops.

In addition to the characteristic of the cultivated crops as commercial crops, the socio-economic aspects of the Kulon Progo area may also contribute to the farmers' choice to use new media technologies. Mobilized by the relatively young and well-educated farmers, the higher household incomes and better rural infrastructure and telecommunication networks facilitate a better opportunity for the farmers to use new media (ICTs) to overcome various problems in agricultural activities.

Therefore, appropriate development of infrastructure and telecommunication networks in rural areas becomes a crucial issue for the future to support the various types of information and innovation needed by rural people. ICT development should be supported by the central and local governments and by the private sector to create a better atmosphere for agricultural development activities. Additionally, telecommunication network maintenance and electrification would also facilitate access to ICT utilization, especially operating mobile phones and smartphones in rural areas.

CONCLUSION

Generally, the majority of the farmers had similar access and utilization of electronic media. Electronic media usage, such as televisions, radios, mobile phones and smartphones, were mostly privately owned by farmers compared with printed media ownership. Electronic media was generally utilized to gain information related to social, cultural, economic and environmental issues. To gain this information, electronic media that were commonly used included televisions and radios (conventional electronic) and mobile phones (new media). Utilization of the internet and Short Message Service (SMS) through mobile phones and smartphones has become increasingly popular among the coastal farmers in Kulon Progo Regency, who grow profitable horticultural crops, to access market information. Farmers who use new media in the coastal area are characterized as being young and well-educated, have a higher income, and experience better infrastructure and telecommunication networks. Generally, ICT use by farmers for supporting farming activities is mostly limited due to the technical production aspects of agriculture.

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