An analysis of farmers' capacity of using the Information and Communication Technology (ICT) to acquire agricultural information: A Case Study in Hungama Area

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Abstract

Agriculture sector contributes about 16.5 percent GDP of Sri Lankan economy and 32.2 percent of employment generation (Central Bank 2006). Agricultural development should also move parallel with service and industrial sectors. Therefore, agriculture sector needs the accurate and timely information for correct decision-making process in the present scenario. On this background, access to information is a crucial requirement for sustainability of agriculture sector. Therefore, modern ICT becomes important powerful tool to fulfill the information requirement of the agriculture sector. Internet, e-mails, teleconferencing, video conferencing, multimedia, Interactive Computer Video Technology (ICVT), Interactive Video Disc (IVD) and CD Rom, Expert System (ES) and mobile phones are the major forms of ICTs tools. In present context, the traditional agricultural extension (TAE) and transfer of technology (TOT) would be either shifted or linked with ICT. In the near future, it would be the major form of knowledge and technology transfer system not only agricultural sector but also other fields. On this background, this study was focused to identify the farmers' capacity to use ICT tools for acquiring the knowledge and information related to agriculture. Vegetable farmers in Hungama area were selected as target population and study location, respectively. Both primary and secondary sources were used to collect data. Data were collected using personal interviews method. Further, respondents were selected by using random sample methods. Sample size was 35. The descriptive statistics and correlation test were used to analyze the data. Majority were middle age, full time, middle experience farmers and practicing mono cropping system. Moreover, majority of farmers' family size was medium size and cultivated land size was less than one acre (0.4ha). Majority belong to middle income group. Further majority have participated at least one extension programme. However their ICT capacity is significantly poor. Lack of time, technological barriers such as low ability to use computer and ICT and poor English language ability were the most crucial problem for farmers. Therefore, their background does not facilitate to use the ICT in decision making process related to agriculture sector. On this background, significant initiations are required to increase the farmers' capacity on ICT. In this regard, farmer strengthens determined as most important requirement to popularize ICT among the farmers.

Keywords: Information Communication Technology, ICT capacity and ICT Tools

Introduction

Although the Sri Lanka is moving to the service oriented country, one third of the rural community is still engaging with agriculture sector. It contributes about 11.9 percent GDP of Sri Lankan economy and 32.2 percent of employment generation, (Central Bank, 2007). Agricultural development should also move parallel with service and industrial sectors. Therefore, agriculture sector needs the accurate and timely information for correct decision-making process in present scenario since globalization, privatization and liberalization of the market. On this background, access to information is a crucial requirement for sustainability of agriculture sector as well as other sectors. Therefore, modern ICT becomes important powerful tool to fulfill the information requirement of the agriculture sector. Moreover, the ICT should be major form of agricultural technology dissemination under the existing competitive world to compete with the rapidly growing industrial and service sector. The term ICT was coined by Stevenson in 1997 which is currently used to denote a wide range

of services application and technologies, using various types of equipment and software, often running over telecommunication network, (Arorar et. al 2002). Internet, e-mails, teleconferencing, video conferencing, multimedia, Interactive Computer Video Technology (ICVT), Interactive Video Disc (IVD) and CD Rom, Expert System (ES) and mobile phones are the major forms of ICTs tools, (Souvik, 2002). Furthermore, Manoj 2004 has identified some problems in applying ICT in rural area. Those are poor infrastructure facilities such as electricity, telephone etc in rural areas, low economic status of the rural farmers, low educational status and language barriers of the rural farmers as well as grassroots level extension personnel, high cost involved in establishing and sustaining the community ICT services, and lack of technically competent extension workers.

In present context, the traditional agricultural extension (TAE) and transfer of technology (TOT) would be either shifted or link with ICT. In the near future, it would be the major form of knowledge and technology transfer system not only in agricultural sector as well as other sectors such as education, vocational training and health programmes etc. However, the rural population in Sri Lanka is still facing many difficulties in accessing information in order to make timely decisions. Farther, the agriculture is an area where ICT usage is minimal. Therefore, it is necessary to assess the farmers' capacity to use the ICT as knowledge dissemination tool in developing countries like Sri Lanka. On this background, this study was focused to identify the farmers' capacity to use ICT tools for acquiring the knowledge, and information related to agriculture sector. Specific objectives in this study were to assess the farmers' capacity to use ICT tools, to identify the most convenient ICT tools that can be used to acquire the information by vegetable farmers, to identify the type of information farmers are expecting via ICT, to identify the bottlenecks to promote the ICT tools among farmers, and to identify the appropriate measures to overcome the issures.

Methodology

Majority of farmers in Hungama area in Hambantota district are vegetable farmers. But, their yield, productivity and income are comparatively low, (Amarasinghe et. al, 2003). Therefore, the vegetable farmers in Hungama area need advance agricultural knowledge, information and technology to increase their productivity and income. On this background, ICT as well as traditional extension service can play significant role to improve their livelihood. Therefore, Hungama area was selected as study area by considering high number of farmers.

Both primary and secondary data sources were used for the analysis. Farmers, extension officers and other officers were used as primary data sources. Journals, internet, and research articles were used as secondary data sources. Data were collected with the help of personal interviews and observations during the first quarter of 2008. Further, respondents were selected by using simple random sample methods with the help of sample frame (farmers list) which was prepared by Agriculture Instructor (AI). Sample size was 35. Sample proportion was one third.

Table 1. Variable and their empirical measurement

Variable	Measurement
Age	Chronological age in completed year
Education	Grade
Family size	Number of family members
Land size	Hectors
Farming experience	Farming experience in year
Number of crop cultivated	Number of cultivated crop per season
Nature of farming	Full time or Part time farming
Income	Income Rs. per season
Extension participation	Number of extension activities participated in last year
Information source	Types of information source
Usefulness of information sources	Five-point scale (From highly useful to highly not useful)
Expected information	Types of expected information source
ICT capacity	Five-point scale (Ability to use at least one ICT tools)
Barriers to use ICT tools	Types of barriers to use ICT tools

Age, education, family size, land size, farming experience, number of cultivated crop per season, nature of farming, income, extension participation, information source, usefulness of information sources, expected information, ICT capacity and barriers to use ICT tools were selected as variables. Five-point continuum with weightage of 4,3,2,1; and 0 by considering the ability to use at least one ICT tools was used to measure the ICT capacity of the farmers. Other variables and their empirical measurement are illustrated in Table1. The descriptive statistics such as mean, mode, medium, percentages and correlation test were used to analysis the data.

Result and Discussion

Majority of farmers (71.4%) belonged to middle age category (35 – 55 year). Young and old aged categories were recorded 8.6 and 20 percent respectively. In respect of education of the respondents, it was found that 48.5 percent of farmers have studied up to primary education and 42.8 percent has studied up to GCE Ordinary Level (O/L). There were no farmers educated up to A/L or higher education. There was a negative significant relationship between ICT capacity of farmers with their age, (Table 4, r= -0.47 p= 0.004). It means that old farmers often low educated have very low capacity to use ICT as compare to young and educated farmers. On the other hand, the farmers belonged to old and middle age categories are reluctant to change. They do not welcome the new technology. Therefore, young age farmers should be targeted to introduce the ICT. With keeping the point in mind, appropriate training programmes and campaigns are needed to organize to enhance the ICT capacity of the Hungama area farmers.

Table 2 illustrates that the majority of farmers (57.0 %) have middle size (five to nine family members in their family) family. Mean family size was 5. Forty percent of farmers have small size family. They have less than five family members. Family size with ICT capacity or other variables were not associated. Land size is one of the most critical variable for farming income.

Majority of farmers had (57.0%) small size land less than 0.4 hector. Further, 40 percent farmers have 0.4 to 1.25 ha land extent. Number of cultivated vegetable crops is another important variable for farming income. Table 2 shows that the majority (63%) of farmers were practicing mono cropping system. Land size and number of cultivated vegetable crops were positively correlated, (r= 0.39 p=0.023). It clearly

showed that the farmers have attempted to cultivate more vegetables while increasing their land size. Prominent vegetable of this are was cucurbits, brinjal, ladies fingers, chilly etc. Only 37 percent farmers were practicing mixed cropping. In case of farming experience, majority of respondents (65.0%) belonged to middle experience category. This provides the picture regarding the farming experience of the farmers. Moreover, full time farmers were recorded 80.0 percent as compared to part-time farmers. Farming experience and ICT capacity showed negative association (r= -0.31, p= 0.042) because experienced farmers often belong to old and middle age category. Therefore, their education level was low. Nature of farming was not associated significantly with the ICT capacity. However, part time farmers have shown positive association with the ICT capacity becau: a they have relatively high educational background t' an full time farmers. As a result, they are doing per nanent jobs in either private sector or NGO sector. Therefore, they have fairly exposed to few ICT tools. Farm income was most important variable for farmers. Farm income significantly varied from farmer to farmer. However, majority (54.3%) belonged to middle income group. Considerable amount of farmers have fallen into low income group. It was recorded as 31.4 percent, (Table 2). Income and ICT capacity was positively correlated, (r= 0.38 p=0.024).

Majority of farmers (85.7%) have shown poor interest to acquire the new information on vegetable farming from out side. They believed their own experience or other farmers' experienced. However, table 3 illustrates that the majority (88.5%) of farmers have participated in the various extension programmes. Further, 51 percent of farmers have utilized only few information sources like extension workers and mass media to acquire the latest agricultural information. But, those are also not using regularly. Majority of them used friends, colleagues and chemical agent or chemical sellers as information sources. Use of relevant information sources like cosmopolites such as extension offices and mass media was relatively low among the farmers. Further, majority of farmers indicated that difficulty to meet the relevant officers of the area due to unavailability. On this background, farmers are hesitating to meet the relevant officers to obtain the information. Further, limited number of officers may busy with heavy work load. Therefore, extension officers are unable to meet each farmer in his area. This bottle neck continuously increases the gap between farmers and extension officer or agricultural researcher.

Therefore, transfer of technology (TOT) is not happening as expected.

On the other hand, mass media can enter to minimize the gap between farmers and researcher. Further, majority of farmers (62.8%) have watched only one agricultural TV prorgammes. It was also occasionally. Moreover, 20 percent of farmers have not watched any TV programmes related to agriculture. However, the majority of farmers (70%) who were watching TV programmes have mentioned that the TV programmes are fully relevant to the field. The picture related to the radio was also similar to the TV. Hence, the number of programme watched and number of crops cultivated by the farmers was positively correlated, (p= 0.49 p= 0.002). It clearly showed that farmers who have large land extent facilitate to cultivate more vegetables and those farmers try to get more information through various sources. Their ICT capacity compared to others were also relatively high. So, relatively large land holder with practicing mixed cropping can be considered as potential farmers to introduce the ICT in agriculture sector. When consider about agricultural journals or farm journals, 97 percent of farmers have not read any kind of journal. Only 3 percent of farmers have read a journal but it is not a regular base. This provides the picture regarding the farmers' attitude toward the agricultural information sources such as cosmopolites and mass media. Therefore, ICT can play major role to minimize this communication error. Young farmers and farmers with large land holding have mobile phone. Therefore, mobile phone can be taken into the basic ICT tools at the establishment stage.

Table 2: Personal characteristics of farmers (N = 35)

Variables and Categories	Number of farmers	Percentage (%)
1. Age (Year)		
Young (Less than 35)	3	8.6
Middle (35 to 55)	25	71.4
Old (Higher than 56)	7	20
2. Education (Grade)		
Primary education	17	48.6
Grade 6 to 9	15	42.9
Ordinary Level	03	8.5
Advance Level	0	0
3. Family size		
Small size(Less than 4)	14	40.0
Medium size (5-8)	20	57.1
Large size (Above 9)	01	2.9
4. Land size (ha)		
Less than 0.4ha	20	57.1
0.5 - 1.25	03	8.5
Higher than 1.25 ha	12	34.4
5. Cropping patern		
Mono cropping	22	62.9
Mixed cropping	13	37.1
6. Farming experience		
Low (less than 5 years)	02	5.8
Medium (5 - 15)	20	57.1
High (Higher than 15)	13	37.1
7. Income (Rs.)		
Low (Less than 5000)	11	31.4
Medium(5000- 15000)	19	54.3
High(Higher than 15001)	5	14.3
8. Nature of farming		
Full time	07	80.0
Part time	28	20.0

Table 3. Extension participation, Information sources and ICT capacity of farmers

Variables and Categories	Number of farmers	Percentage (%)
1. Extension participation		
Yes	31	88.6
No	04	11.4
2. Information sources		
Low	17	48.6
High	18	51.4
3. ICT capacity of farmers		
Low	33	94.3
Average	02	5.7
High	0	0

Majority of farmers (88%) were ready to obtain the market conditions, demand and supply of vegetable and input prices through media. Moreover, 37.1 and 29 percent of farmers like to obtain about weather condition and detail about new management practices, inputs such as seed, chemical and their application via TV and radio, respectively. Thus, ICT can be considered as an alternative method of TOT. Therefore, this should be taken into care by the policy maker. On the other hand, farmers have favorable attitude toward the ICT tools. Majority of farmers (71%) believed that some ICT tools such as mobile phones are useful for farmers than cosmopolite sources to obtain the market information. But, they did not prefer about computer based technology such as internet, E-mails, teleconferencing, video conferencing, multimedia, interactive computer video technology (ICVT), interactive video disc (IVD) and CD Rome, Expert System (ES) than mass media such as TV, radio or cosmopolite sources. They have hesitation to use computer based ICT due to lack of confidence. This may be due to low education and inexperience in using computer. Further, almost all farmers have not even touched the any computer.

Table 4: Relationship of ICT capacity with other variables

Variables	r- value	Probability level
Age	0.47	0.004
Farming experience	-0.31	0.042
Income	0.38	0.024
Level of barriers	-0.53	0.00

With regard to the farmers' ICT capacity it was recorded as minimal. No one has their own personal computer and computer skill to use the computer. But, most of farmers have radio, TV, fixed telephone and mobile phone. At present scenario, mobile phone is the most convenient ICT tools for farmers. Therefore, necessary information can be sent via mobile phone. It may be a voice mode or SMS mode. On the other hand, at present, Government of Sri Lanka is promoting to enhance the ICT knowledge of the rural community through Nenasala and Vidhatha centres. Presidential Secretariat is funding to each village to stabilize a Nenasala center to improve the ICT education in rural people, (Sunday Observer, 2008). Therefore, Nenasala and Vidhatha centers are the most important grass root level institute for the rural community which can be used to get the ICT facility. These institutes would help not only to increase the ICT capacity but also to acquire the necessary new information for the rural area. Specially demand and supply trend, market price, and necessary quality etc. of agricultural products can be transferred through ICT.

On this background, farmers' accessibility to Nenasala and Vidhatha centres were taken in to consideration for the study. However, 57.1 percent of farmers have not even visited to these centers. Their awareness about Nenasala and Vidhatha centres were minimal. Further, 42.4 percent of farmers have

attended to the various programmes conducted by such institutes. Out of them, 53.3 percent of farmers have participated frequently for the programme. Basically, those programmes have been covered to introduce the new technology, value addition for agricultural product and various production packages. On this background, it is necessary to consider by the officers in Nenasala and Vidhatha centres to organize special training programmes on ICT for farmers. This training programme would be helped to open new dimension for the rural farmers.

ICT is not popular among the rural farmers in Hungama area. This is due to many reasons. However the most significant barrier was lack of time for farmers to either learn or use ICT tools. Majority (42.8 %) of farmers mentioned that their ICT knowledge and usage were minimal due to lack of time. Second point was technological barriers. Farmers' knowledge on computer and ICT tools were very poor. On the other hand, they did not have any access to use a computer. It is almost zero. This statement was given by the 31.4 percent farmers. Therefore, farmers were hesitating to use ICT for decision making process. Further, 22.8 percent have mentioned that poor English language as a problem to use ICT for their life. Level of barriers to use ICT and farmers ICT capacity was negatively correlated (Table 4, r= -0.53 p = 0.00). It means that high number of barriers facing by farmers leads to reduce the ICT capacity. However, low educated farmers and the farmers with small land size were facing many difficulties than others. Therefore, this must be taken into consideration while introducing ICT for farmers.

Conclusion and Recommendation

Majority were middle age, full time, middle experience farmers and practicing mono cropping system. Moreover, majority of farmers' family size was medium and cultivated land size was less than one acre. Majority belong to middle income group. Further majority have participated at least one extension programme. However their ICT capacity is very poor. Further, lack of time, technological barriers such as low ability to use computer and ICT and poor English language ability are the most crucial problem for farmers to use the ICT. Therefore, their background does not facilitate to use the ICT in decision making process related to agriculture sector. But, ICT is receiving greater attention over the entire global because it has remarkable advantages in national integration and endless other socio economic and cultural purpose. It is time that the full potential of ICT is harnessed to serve the specific needs of poor farming communities. ICT can accelerate broad based

rural development through developing the rural agricultural sector by increasing awareness of new agricultural technology. Further, ICT helps to make a central pillar of overall development strategy of the farming communities to increase their living conditions by transferring timely and accurate information for appropriate decision regarding agriculture. On this background, significant initiations are required to increase the farmers' capacity on ICT because their potential to apply ICT in agriculture is very poor. In this regard, strengthen of farmer and farm organizations determine the most important requirement to popularize the ICT among the farmers.

Sound training programmes should be organized to introduce the ICT. It may help to increase the social capital of the rural community. Multistage and multi stakeholder programme are needed for this purpose. Therefore, community based organization and officers of farm organization, extension officers and grass root level institutes viz. NGOs, Nenasala and Vidhatha centers should be taken this responsibility. On the other hand strengthen of grass root level organization and institutes also very important to popularize the ICT in rural area by strengthen the social capital.

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