



Utilization of ICT based Dissemination System for Aquaculture and Allied Activities among Clientele of a Coastal KVK

P. Mahalakshmi*, B. Shanthi, V. S. Chandrasekaran and T. Ravisankar

ICAR- Central Institute of Brackishwater Aquaculture, 75, Santhome High Road, Raja Annamalai Puram, Chennai - 600 028, India

Abstract

Aquaculture farms are often in dispersed locations that are difficult to reach and taking into account their high-tech farming practices, the need for the utilization of Information Communication Technologies (ICTs) for information access is very critical. On the other hand, various coastal Krishi Vigyan Kendras (KVKs) in India are electronically connected through internet facilities for sharing the information among all stakeholders. Data were collected from 60 clients of a coastal KVK at Kattupakkam in Kancheepuram district of Tamil Nadu to assess the extent of utilization of ICT based dissemination tools for aquaculture and allied activities. The utilization quotient obtained from the respondents ranged from 52.78 to 88.89 with mean of 63.19. The utilization of ICT dissemination system were through mobile phones (88.89%), video films (83.33%), television (69.44%) and audio CDs (66.67%). Pearson's product moment correlation analysis revealed that the variables *viz.*, education, extension media contact, training exposure, knowledge in ICT and participation in ICT project activities had significant and positive relationship with utilization of ICT while age had negative relationship. The step-wise regression analysis further revealed that 82.5% of the variation in the utilization of ICT can be accounted by the combined effect of five independent variables such as knowledge gained through ICT, education, participation in ICT activities, extension media contact and training exposure. The key problems hindering the use of ICTs in the farming operations were, lack of ICT based technical

knowledge, cost factor and lack of technical support. One-fifth of the respondents identified that the extension services can play a predominant role in imparting technical support for farmers and also for explaining the usage of ICT tools in farming operations.

Keywords: Information communication technology, coastal KVK, utilization behavior, step-wise multiple regression

Introduction

Aquaculture is emerging as a leading contributor to fish production. With the rapid increase in world population, aquaculture becomes imperative for producing high quality animal protein with less cost. On the other hand, increase in aquaculture units and better farming practices along with increasing complexities emphasize the need for an efficient information network which is possible through the utilization of Information Communication Technologies (ICTs) (Mahalakshmi & Ganeasn, 2012). Considering the poor reach of extension services in India, contacting the farmers directly with ICT aided intervention is an appealing idea (Saravanan, 2010). The ICT tools have the ability to reach farmers directly, can enable two-way information sharing processes, have greater storage capacity, are faster and can increase market efficiency by addressing information gaps and blockages (Chapman & Slaymaker, 2002).

The policy framework for agricultural extension in India highlights the opportunity for information and communication technology to improve the quality and accelerate the transfer and exchange of information to farmers and consequently ICT is given a high priority, particularly as a tool for improving the marketing aspects of farm enterprises

Received 14 May 2014; Revised 27 July 2014; Accepted 02 September 2014

* E-mail: maha@ciba.res.in

(Glendenning et al., 2010). In India, extension activities of the Indian Council of Agricultural Research (ICAR) are carried out through the Agriculture Technology Information Centres (ATIC), Trainers Training Centres (TTC) and district-level Krishi Vigyan Kendras (KVKs) (Venkatasubramanian & Mahalakshmi, 2012). The major objective of the KVKs is to develop and spread location specific technology modules in various areas of crop science, animal husbandry, poultry science, fisheries and other income generating activities for farmers and farm-women (ICAR, 2009). Various KVKs are electronically connected through Local and Wide Area Networks. This will provide opportunity to share recent developments in agriculture and allied sectors. It also helps in sharing of information, farm advisory services, etc.

The e-linkage for remotely located 192 KVKs has been established with the VSAT Hub at ICAR Headquarters in New Delhi (Department of Electronics and Information Technology, 2012). The e-linkage facility is expected to provide access to global e-content on agriculture and restructuring the web pages of KVKs with user-friendly information such as FAQs, weather forecasting, calendar of activities.

In view of the usage of ICT tools such as computer, internet, mobile phone and video films for rapid and timely dissemination of demand driven technology from KVKs to farmers, an attempt has been made in the present study (i) to assess the extent of utilization of ICT based dissemination system by the clients of coastal KVK for aquaculture and allied activities and (ii) to determine the effects of selected socio-economic variables of the users on the extent of utilization of ICT based dissemination system.

Materials and Methods

The study was conducted among the beneficiaries of a coastal KVK located at Kattupakkam in Kancheepuram district of Tamil Nadu, which is identified as one of the coastal KVKs for the establishment of e-linkage facilities by the ICAR. A sample of 60 KVK users proportionately from five coastal villages of Kancheepuram district *viz.*, Chemmencherrykuppam (15), Pudhupattinam (15), Kovalam (15), Oyyalikuppam (5) and Meyyurkuppam (10) were selected for the present study. The primary data were collected from the respondents by employing a well-structured and pre-tested interview schedule.

Eleven independent variables *viz.*, age, marital status, education, family size, occupation, social participation, marketing behaviour, extension media contact, training exposure, knowledge in ICT and participation in ICT activities were measured and analysed using appropriate tools. In measuring the extension media contact of a respondent, seven parameters were considered. Among these, two related to individuals (extension officer and field extension agent), three to groups (group discussion, training session and demonstration meeting) and the remaining two related to mass contact (visiting ICT fair/exhibition and reading of extension materials). The dependent variable studied was the extent of utilization of eight ICT dissemination tools *viz.*, radio, television, mobile phones, internet, video film, audio CD, touch screen kiosk and interactive modules on aquaculture. The respondents were asked to indicate their extent of utilization of ICT dissemination tools in a four-point continuum namely full, partial, low and nil with the scores of 3, 2, 1 and 0 respectively. The utilization behaviour was measured using the utilization quotient formula as below;

$$UQ_i = \frac{\sum_{j=1}^M (e_{ij} \times W_j)}{M_j} \times 100$$

where 'i' is the number of ICT based dissemination system; j = 1 to 4, is the number of scales used; UQ_i is the utilization quotient of i^{th} ICT dissemination system; e_{ij} is the number of responses of j^{th} scale of i^{th} ICT dissemination system; W_j is the weightage assigned to j^{th} scale; and M_j is maximum score assigned to i^{th} ICT dissemination system.

Besides statistical measures such as mean and standard deviation, the Pearson's product moment correlation and step-wise multiple regression analysis were used for analyzing the data.

Results and Discussion

The profile characteristics of the respondents are presented in Table 1 which shows that the respondents were quite young leading to an inference that the young farmers were more interested to learn and utilize modern tools and techniques. This finding agrees with Salau & Saingbe (2008), which indicated that elderly people might be less interested in the use of hi-tech innovations. The average marital

Table 1. Profile characteristics of respondents

| Variables | Unit of measurement | Score range | | Mean | Standard deviation |
|---|---------------------|-------------|----------|------|--------------------|
| | | Possible | Observed | | |
| Age | Years | Unknown | 15-41 | 26 | 6.65 |
| Marital status | Yes/No | 0-1 | 0-1 | 0.72 | 0.45 |
| Education | Year of schooling | 0-16 | 2-15 | 6.3 | 3.55 |
| Family size | Number | Unknown | 2-9 | 4.2 | 1.8 |
| Occupation | Scale score | 1-2 | 1-2 | 1.2 | 0.40 |
| Social participation | Scale score | 1-2 | 1-2 | 1.3 | 0.44 |
| Marketing behavior | Scale score | 1-2 | 1-2 | 1.2 | 0.39 |
| Extension media contact | Scale score | 0-30 | 0-19 | 7.1 | 5.03 |
| Training exposure | Days | Unknown | 0-7 | 1.3 | 1.59 |
| Knowledge in ICT | Scale score | 0-3 | 0-3 | 1.4 | 1.40 |
| Participation in ICT project activities | Scale score | 0-3 | 0-3 | 0.78 | 0.76 |

status (0.72) shows that 72% of the respondents were married. The average education level (6.3) was quite large. Overall, most of the respondents had higher secondary qualification or more. This implies that almost all were literates and were able to utilize the ICTs for aquaculture related information and share the same with fellow farmers and friends. Arokoyo (2005) identified high level of illiteracy as a serious constraint to ICT utilization by extension workers and farmers. A farmer with the ability to read, write and calculate is more likely to use the modern tools and techniques than an illiterate farmer. The average family size (4.2) was quite low. More than half (60%) of the respondents had small families of upto four members. The average extension media contact score (7.1) was relatively low because the respondents informed that the young farmers were only attending the ICT related meetings which were conducted by KVKs and also contacting the extension officers for clarifying doubts regarding modern tools and their accessibilities. The average training exposure (1.3) shows that most of the respondents (60%) had attended training programmes organized by the KVK, State Fisheries Departments and Non-Government Organizations. Out of 60%, nearly 30% of the respondents had attended exclusively computer related training programs. The average knowledge in ICT (1.4) and participation in ICT project activities (0.76) were low. The respondents felt that they had exposure for

participation in the ICT activities only through the KVK training program.

The utilization quotient obtained from the respondents ranged from 52.78 to 88.89 with the mean of 63.19 (Table 2). It shows that the utilization behavior of the respondents was high with respect to the utilization of ICT tools *viz.*, mobile phones (88.89%), video film (83.33%), television (69.44%) and audio CD (66.67%). KVK send short message service (SMS) to disseminate agriculture related information. Almost all the respondents felt that they had seen the video films related to ornamental fish farming, shrimp culture, mushroom culture and value added food products during the extension programmes

Table 2. Utilization behaviour of beneficiaries of KVK

| ICT based dissemination system | Utilization quotient (%) |
|--------------------------------|--------------------------|
| Radio | 55.56 |
| Television | 69.44 |
| Mobile telephones | 88.89 |
| Internet | 52.78 |
| Video film | 83.33 |
| Audio CD | 66.67 |
| Touch screen kiosk | 38.89 |
| Interactive modules | 56.11 |

conducted by KVK and state fisheries departments. The ICT tools such as radio (55.56%), interactive modules (56.11%) and internet (52.78%) have accorded comparatively low utilization behavior. Though the farmers were listening to the radio and viewing television, the use of radio and television for aquaculture and allied activities was low compared to mobile telephone. They also expressed that internet service was mostly used for sending e-mail to the friends and fellow farmers. This study also revealed that the respondents had exposure on usage of internet services for monitoring the market prices and shrimp production. Earlier, Mahalakshmi et al. (2008) reported that shrimp farmers were mostly utilizing the internet services for information regarding farm business and management, market prices and shrimp production and only few farmers had exposure on programming and database design. In case of touch screen kiosk use, one-third of them (38.89%) had used and expressed that they used the kiosk only when they attended the training programme in KVK.

The analysis of extent of utilization for ICT based dissemination system by the clients of KVK for their aquaculture and allied activities (Fig. 1) revealed that there was quite high extent of utilization for some of the ICT dissemination systems such as mobile telephones (66.67%), video film (58.33%), television (50%) and audio CD (50%). It was also seen that there was quite low extent of utilization by the users with respect to touch screen kiosks (16.67%). Out of eight ICT dissemination systems, mobile phone was highly recognized and utilized by the users for getting information regarding aquaculture and allied activities.

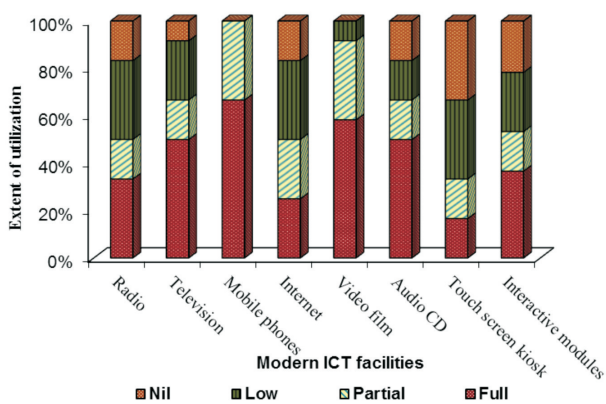


Fig. 1. Extent of utilization of ICT based dissemination system by the users of KVK

Relationships between selected independent variables and extent of utilization were determined by the Pearson’s product moment correlation coefficient (Table 3). The results show that the variables education, extension media contact, training exposure, knowledge in ICT and participation in ICT project activities had significant and positive relationship with utilization of ICT based dissemination system while age had negative relationship. This implies that the higher the level of education, the higher the level of ICT utilization and vice versa.

Table 3. Relationship between extent of utilization and selected variables

| Independent variables | Correlation coefficient (r) |
|---------------------------------|-----------------------------|
| Age | -0.334** |
| Marital status | -0.201 |
| Education | 0.766** |
| Family size | 0.132 |
| Occupation | 0.035 |
| Social participation | 0.082 |
| Marketing behavior | -0.012 |
| Extension media contact | 0.297* |
| Training exposure | 0.506** |
| Knowledge in ICT | 0.779** |
| Participation in ICT activities | 0.726** |

* p<0.05 and **p<0.01 with 58 df

Step-wise multiple regression analysis presented in Table 4 shows that, out of the five independent variables which had significant and positive relationship as shown in Table 3, knowledge gained through ICT alone was responsible for 60.1% of the variation in extent of utilization, whilst education predicted 14.1%, participation in ICT activities predicted 5.9%, extension media contact predicted 1.3% and training exposure predicted 1.1%. Result show that 82.5% of the variation in the utilization of ICT based dissemination system can be accounted by the combined effect of these five independent variables.

When the farmers were asked to give reasons for not using ICT tools in their farming operations, 30% indicated that they did not have technical knowledge, while 40% of the respondents cited cost factor as the reason and remaining (30%) expressed lack of technical support as reason. The findings indicate

Table 4. Step-wise multiple regression analysis showing the variation of women empowerment score explained by different factors

| Model | Variable entered | Multiple R | Coefficient of determination R ² | Percent of variation expressed |
|-------|---|------------|---|--------------------------------|
| 1 | Knowledge in ICT | 0.779 | 0.601 | 60.1 |
| 2 | Education | 0.866 | 0.742 | 14.1 |
| 3 | Participation in ICT project activities | 0.900 | 0.801 | 5.9 |
| 4 | Extension media contact | 0.909 | 0.814 | 1.3 |
| 5 | Training exposure | 0.917 | 0.825 | 1.1 |

that the farmers need to be exposed to the benefits of the technological innovations like sensors, data loggers, microprocessors and computers. One-fifth of the respondents identified that the extension services can play a predominant role in imparting ICT application training and technical support for farmers and also explaining the usage of ICT tools in farming operations. The training on advanced technologies of aquaculture helps the farmers to increase their efficiency and profitability of aquaculture production. Thus, the ICTs could be used to increase the connectivity between various extension approaches. However, ICTs cannot be a substitute for the institutional weaknesses in the system.

Acknowledgement

The authors are thankful to Dr. A.G. Ponniah, Former Director, Central Institute of Brackishwater Aquaculture, Chennai, for his guidance and encouragement. The authors are also thankful to all the respondent farmers and Programme Coordinator and Subject Matter Specialist (Fisheries), KVK, Kattupakkam, Kancheepuram district, Tamil Nadu, for their cooperation and coordination during the study.

References

- Arokoyo, T. (2005) Information Communication Technologies (ICTs) Application in Agricultural Extension Delivery. In: *Agricultural Extension in Nigeria* (Adedoyin, S. F., Ed) Published by Agricultural Extension Society of Nigeria (AESON) pp 245-251
- Chapman, R. and Slaymaker, T. (2002) ICTs and Rural Development: Review of the Literature, Current Interventions and Opportunities for Action. Working Paper 192, 36p. Overseas Development Institute, London
- Department of Electronics and Information Technology (2012) e-Linkage of Krishi Vigyan Kendras under ICAR. Annual Report 2011-12, 74p. Ministry of Communications and Information Technology, New Delhi
- Glendenning, C. J., Babu, S. and Asenso-Okyere, K. (2010) Review of Agricultural Extension in India- Are Farmers' Information Needs Being Met?. IFPRI Discussion Paper 01048. 31 p. Eastern and Southern Africa Regional Office, International Food Policy Research Institute, USA
- ICAR Proceedings (2009) KVK as resource and knowledge centre for agricultural technology. In: Fourth National Conference on KVK, 268 p. Tamil Nadu Agricultural University, Coimbatore, 6 to 8 November, 2009
- Mahalakshmi, P., Shanthi, B., Krishnan, M., Vimala, D. D. and Sarada, C. (2008) Awareness and utilization of computers by shrimp farmers. *Fish. Technol.* 45: 121-126
- Mahalakshmi, P. and Ganesan, K. (2012) Decision Making Models for Aquaculture Farming Development. 257p. Today & Tomorrow's Printers and Publishers, New Delhi
- Salau, E. S. and Saingbe, N. D. (2008) Access and utilization of information and communication technologies (ICTs) among agricultural researchers and extension workers in selected institutions in Nasarawastate of Nigeria. *PAT.* 4: 1-11
- Saravanan, R. (2010) ICTs for Agricultural Extension: Global Experiments, Innovations and Experiences (Saravanan, R., Ed), New India Publishing Agency, New Delhi
- Venkatasubramanian, V. and Mahalakshmi, P. (2012) Innovative institutional approaches for agricultural knowledge system management in India. Improving Agricultural Knowledge and Innovation Systems: OECD Conference Proceedings. pp 131-150. OECD Publishing, Paris