e-Sagu Aqua: An innovative information and communication technology model for transfer of technology for aquaculture

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Fisheries and aquaculture extension services respond to knowledge needs of farmers and rural people with a view to improving fish production, livelihoods, welfare and management of natural resources. Ideally, fisheries extension should facilitate the flow of information and technology from R&D to farming communities and return feedback on field requirements to researchers. In the past in India, extension was seen primarily as a public service, organised, managed and institutionalised by national government. Today, government and public extension institutions must adopt diverse strategies to build dialogue and collaboration among a variety of public, private and non–governmental and community based institutions.

Various models of extension such as the 'transfer of technology model'[1]; the 'integrated rural approach[2], 'training and visit' system[3], 'farmer field schools'[4] and 'decentralised extension' models have been tried over the years in many developing countries. These models have achieved considerable success in aiding the food self sufficiency in many countries but still extension systems are left with many constraints to overcome and challenges to be met. These challenges of extension have opened the door to examine new approaches such as how information and communication technology (ICT) can be cost-effectively and practically employed to facilitate knowledge sharing among farmers, extension agents and other stakeholders[5].

In the past few years, the power of the internet as a communication medium has captured the imagination of developmental organisations around the world. A number of projects have been undertaken in various parts of the world attempting to provide sustainable digital access to rural communities. ICT driven models currently dominate in Indian fisheries are Aqua-Choupal, Village Knowledge Centres/Rural Knowledge Centres, web kiosks, help lines, Kisan Call Centres and e-Sagu Aqua. The e-Sagu Aqua is an innovative and unique model of information exchange which has been implemented in freshwater in Andhra Pradesh State of India. This article deals with the profile, technology transfer modalities, model components, information and communication system and strength and limitations of the e-Sagu Aqua model.

Approach

We investigated the e-Sagu Aqua model in West Godavari district of Andhra Pradesh where it was in operation. We interviewed 47 participating farmers using a structured interview schedule on the model profile, technology transfer modalities, components of the model, the information and communication system and its data base. The benefits accrued, the strengths and the limitations of the model were also studied. Farmers were asked to rank 15 strengths and nine limitations of the system.

Findings

Profile of the model – key players

The primary centre of e-Sagu Aqua was housed at the International Institute of Information Technology (IIIT) in Hyderabad, manned by a team of fishery experts. The fisheries information system comprised animal and farm databases, weather and other agro-ecological data. This project was sponsored and managed by Media Lab Asia, Department of Information Technology (DoIT), Government of India (GoI) as a not-for-profit research organisation. The project design was done by Media Lab Asia and IIIT Hyderabad together.

Technology transfer modalities

A team of fishery experts worked at the Central e-Sagu Aqua system lab supported by aquaculture/fisheries information system located in state headquarters. One small computer centre (a few computers and one computer operator) were linked through a dial-up internet connection that had been established for a group of five to six villages. An appropriate numbers of coordinators were selected from the villages. Depending on the crop, each coordinator was allotted a fixed number of farms. The coordinator collected the details of the farms they were responsible for surveying including soil data, water resources and capital availability and sent the information to the main e-Sagu Aqua system. Every day, the coordinator visited a fixed number of farms and took four to five photographs of samples and pond conditions in each farm. The photographs and other information are recorded in a CD-ROM and sent to the main lab through a regular parcel service. Aquaculture experts with diverse expertise (soil, water, production and health) at the central e-Sagu lab analysed the crop situation with respect to soil, weather and other pond management practices and prepared farm specific advice for transmission back to the farmers. This advice was downloaded at the village e-Sagu centres. The coordinator delivered the advice to the concerned farmer. Thus each farm received required advice at regular intervals, starting from stocking operations to harvest precautions.

Components

The system essentially comprised four components ie. farmers, coordinators, fishery experts and an information and communication system.

i) Farmers

The farmers are usually engaged in their day-to-day farm operations and hardly find time to visit either reliable source of information like scientists of aquaculture/fisheries research stations nearby or officers of department of fisheries / any NGO operating in that area to find solutions for their farm related problems.

ii) Coordinators

The coordinators were either educated progressive farmers or qualified rural youth who possessed adequate fish farming knowledge and were generally selected from the same village. Soon after selection, they were trained rigorously by the fishery experts on aspects like soil sample collection for soil testing, water sampling, water testing, improved farm practices, pond management practices, identification of various disease, symptoms of damage, methods of field investigation, symptoms of diagnosis different diseases, disorders, deficiencies, allied aspects and basic photographic techniques.

iii) Fishery experts

A fishery expert with a Masters degree in fisheries/ aquaculture has been recruited. He is directed to collect information and update his knowledge in relation to the fish culture from sources such standard text books, journals, popular articles, bulletins released by Department of Fisheries and Regional Fisheries Research Stations, special publications from reputed national and international research institutes and also information available on the internet. Linkages with other fishery scientists of reputed research institutes and aquaculture information centres were also made.

Information and communication system

The system contained the following information in its database: Farm history, crop details, soil details, weather data, farmer details, case sheets, photo bank and a library.

Strengths and limitations of e-Sagu Aqua model

Strengths

Fish farmers in the West Godavari district faced enduring problems in freshwater fish culture. Experts of e-Sagu Aqua system hold the key to the transformation of fishery technologies and made it responsive to the urge of aqua farmers and it served the purpose of transfer of technology (TOT) very effectively like reduction of lag period from lab to land. The major species covered were rohu *(Labeo rohita)*, catla *(Catla catla)* and mrigal *(Cirrhinus cirrhosus)*. Moreover, the experts were proactive and took all possible precautions to avert problematic situations by reminding the farmer about the operations to be taken up immediately on weekly basis. Therefore, this system had more penetration and helped the scientific community to the reach all the farmers in remote villages besides developing credibility. To create more awareness among the farming community and to disseminate fishery technologies there was a rapid exchange of information among the stake holders. During the time of emergency such as disease outbreaks in the fish farms, accurate and effective of advice were delivered by the expert team to the farmers. The farmers felt that there is an in-built accountability in this system as the agro-advisory developed by each expert is archived and delivered in the form of printed matter. Hence, the experts were more watchful, paid maximum attention and took most care while developing and submitting the advice. Quick deployment of services during the time of crisis (100%), accountable advice (100%), significant reduction of lag period from lab to land (96%), cost effective methods (94%), vehicle to reach the remote places (43%), rapid exchange of information among the major stakeholders (40.42 %)were the strengths of the e-Sagu model as perceived by the respondents. One of the major constraints in fishery technology transfer is the lack of access to information. Viewed in this context the commencement of the project has improved the information reach significantly where the project staff have gone to the field every week to provide appropriate advice based on the crop status. However, this reliance was more in the case of small farmers as compared to medium and large farmers. On the contrary access to fishery scientists was more among large farms as compared medium and small farms.

Limitations

Limited financial resources and limited coverage of subjects were the major weaknesses of the model felt by 100 and 56% of the respondents respectively. e-Sagu Aqua was funded by Media Lab Asia for two years to implement in Mahbubabad mandal of Warangal and Mudigonda mandal of Khammam districts of Andhra Pradesh related to agricultural crops. The same project was then implemented in West Godavari district of Andhra Pradesh for fresh water fish culture in August 2006. The Media Lab Asia, with a vision of leveraging information and communication technologies and other advanced technologies for the benefit of the fish farmers' development, focuses on ICT application for healthcare, education, livelihood generation and empowerment of the disabled and providing rural connectivity. Since the Media Lab financial support for the project ended, the model has been modified as a new ICT application or 'virtual' model by one of the collaborators. A constraint is that ICT-enabled models need to grow to the stage where they can attract institutional investors, as computer penetration is still poor in rural locations and support is required to establish the necessary facilities. The present project concentrated on technology transfer and support of fresh water fish farming alone. If content and technical expertise was built up for other subjects such as horticulture, poultry, animal husbandry and agriculture it would be beneficial for the farmers.

Conclusion

Recent developments in information and communications technology (ICT) offer a great opportunity to facilitate the flow of information and technology services delivery to farmers In this paper, by integrating freshwater aquaculture and information technologies, a framework for ICT based aquaculture information extension and dissemination is proposed. By exploiting progress in information technology, extension aims to provide fresh and expert advice to the needy farmers in a timely and personalised manner to improve freshwater aquaculture productivity and also to

increase the profitability of the farmer by increasing the efficiency of aquaculture inputs and reducing the cost of production. The real benefits lie not in the provision of technology per se, but rather in its application to create powerful social and economic networks by dramatically improving communication and the exchange of information. 'e sagu Aqua' is a successful case of ICT being used in highly effective manner to directly address development goals.

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