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ROLE OF INFORMATION SOURCES IN DEVELOPING ENVIRONMENTAL CONCERNS OF THE STAKEHOLDERS IN RICE FARMING

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Abstract: Despite green revolution contributed significantly in increasing production and productivity in the initial years, the adverse effects visibly stands out as, deterioration of soil quality, environmental pollution due to over and injudicious use of inorganic inputs, loss of biodiversity and genetic erosion. Environmental concerns of the stakeholders in rice cultivation have a greater voice on the future of rice farming. There are various agencies influencing stakeholders of rice farming in adopting eco-friendly cultivation practices. The role played by these agencies is very significant in view of eco-system upkeep. Hence a study was designed to identify the various agencies influencing the stakeholders of rice farming in developing environmental concerns and the extent of influence exerted by them as perceived by the stakeholders. This study was conducted in Palakkad district of Kerala covering four major blocks based on the extent of rice area. Largest padashekaram one each from the four grama panchayats were selected and ten beneficiary farmers, agricultural labourers, people's representatives/ social activists in the same padashekaram were selected randomly for the study. Thus a total of 40 beneficiary farmers, 40 agricultural labourers, 40 people's representatives/social activists and 40 extension functionaries were selected from the study area. Total of 160 respondents belonging to the four categories constituted the sample of this study. Direct survey approach along with focus group discussion were adopted for recording the primary data from the respondents at the field level, based on ex-post facto design. The various agencies influencing the stakeholders were identified from the pilot study and based on expert opinion. The respondents were asked to score the different agencies influencing them in developing environmental concern. It was found that direct experience and mass media had very positively influenced the process of developing environmental concerns of farmers and agricultural labourers respectively. In case of extension personnel and peoples' representatives/social activists, literature had very positively influenced them. As the last two categories were educated, literature could have influenced them to a greater extent, whereas majority of the labourers who were illiterate were more dependent on mass media. The reachability of internet technology was also very meager among the farming community. It was bizarre to note that majority of the extension personnel were still not using internet for accessing information. The ICT in agriculture is an emerging field and focus on the enhancement of agricultural and rural development through improved information and communication processes. In this technological era we have to mainstream Information Communication Technology into various sub-sectors of agriculture like extension, environmental extension, market, rural finance etc through Village Resource Centre/ Village Knowledge Centre initiatives that provide need-based locale-specific, demand driven information to the local communities for improving their livelihoods. This concept has gained international appreciation and has been showcased as one of the best models of ICT integrated rural development.

Key words: Extent of influence, Direct experience, Mass media, Internet, Information Communication Technology, Village Resource/Village Knowledge Centers

INTRODUCTION

Rice is life as it is environment, society, culture, politics, business, and above all the life saving grain of 3 billon people of this planet. Rice can be grown under diverse ecological conditions and this wetland ecosystem has a very prominent role in maintaining the microclimate of the area. They have an imminent role in conserving water, stabilizing ground water table and preventing floods. Moreover, rice fields harbors diverse flora and fauna. Rice area in India shows a meager increase from 30.81million hectares in 1950-51 to 45.35 million hectares in 2008-09, while the production has scaled greater heights from 20.58 million tonnes to 99.15

million tonnes during the same period (Department of Agriculture and Co-operation, 2009). This increase may be attributed to green revolution, which was a milestone in the agrarian history. Despite green revolution contributed significantly in increasing production and productivity in the initial years, the adverse effects visibly stands out as, deterioration of soil quality, environmental pollution due to over and uncontrolled use of inorganic inputs by farmers, loss of biodiversity and genetic erosion. Rice wetland eco-system being highly fragile, the adverse effects of input intensive farming is prominent and far reaching.

As far as Kerala is concerned, "farming" was used as a synonym of rice cultivation in the past. Rice farming was indispensable production endeavor, which had influenced the lives of every individual in the society under feudal agrarian relations. Haystacks in front of a house were then considered to be the symbol of prosperity. Moreover, rice fields played a very important role in the maintenance of eco-system balance and climate of the state. Agriculture, especially rice farming has been sidelined in the process of development and large tracts of rice fields have been converted for building better infrastructure in the state. The cropping pattern too had undergone major changes in the past four decades. Rice, which had occupied the premier position during 1960-61 occupying 7.79 million hectares slipped to the second position in 1995-96 and further down to third position by 2003-04 (2.34 lakh hectares in 2008-09) while coconut moved from second to first position during this period. Rubber too has increased its area and moved from fourth to second position (Planning Commission, 2008). Environmental concerns of the stakeholders in rice cultivation have a greater voice on the future of rice farming. Environmental concerns for the study is operationalized as the apprehension and subsequent intervention for environmental and economic sustainability against deterioration of soil and water resources due to the over use of pesticides, inefficient use of fertilizers, improper water management practices and loss of bio-diversity due to cultivation of high yielding varieties, conversion of paddy lands etc.

There are various agencies influencing stakeholders of rice farming in adopting ecofriendly cultivation practices at different phases of their life. According to Lopez and Requena (2005) availability of information sources was an important factor in explaining conversion to organic farming. The role played by these information sources is very significant in view of eco-system upkeep and will in turn help the governmental agencies to route their activities on sustainable agriculture and ecosystem conservation through these pinheads that will be more pragmatic. The information sources of organic/eco-friendly cultivation practices and ecosystem conservation can be literature, extension personnel, negative experiences with inorganic farming, internet technology etc as studied by various researchers. The present investigation was undertaken with the following objectives:

1. Study the various agencies influencing the stakeholders of rice farming in developing environmental concerns.
2. The extent of influence exerted by the agencies in developing environmental concerns of stakeholders of rice farming.
3. Major factors influencing the stakeholders in accessing information

METHODOLOGY

The research was undertaken in the state of Kerala during 2010-11. Palakkad district was selected purposively, as the district accounts for about 1/3rd of the total area under rice cultivation of Kerala state and has all the agro-socio-economic conditions needed for paddy cultivation. Four blocks, viz. Kollengode, Kuzhalmannam, Chittur and Alathur were selected purposively based on extent of area under rice. Thekkinchira, Nelliancaud, Manchira and Kolapadam padashekarams were randomly selected from Kollengode, Kuzhalmannam, Nalleppilly and Erimayur Grama Panchayats respectively. Ten beneficiary farmers were randomly selected from each padashekaram. Likewise ten each of agricultural labourers, people's representatives/social activists in the same padashekaram were selected randomly for the study. Thus a total of 40 beneficiary farmers, 40 agricultural labourers

and 40 people's representatives/social activists were selected from the study area. In addition to those included in the selected projects / padashekarams, extension functionaries (agricultural officers and agricultural assistants) from other regions of the district were also randomly selected, so as to make a sample size of 40. Thus a total of 160 respondents belonging to the four categories constituted the sample of this study. A direct survey approach along with focus group discussions were adopted for recording the primary data from the respondents at the field level based on ex-post facto design. The various agencies influencing the stakeholders were identified from the pilot study and based on expert opinion. The interview schedule including the details of the agencies influencing the stakeholders in developing environmental concerns was pre-tested with 10 per cent of the non-sample respondents of each category at random. The respondents were asked to score the different agencies influencing them in developing environmental concerns. The extent of influence ranged in a five-point continuum from a very positive level with a score of '5' to a very negative level carrying a score of '1'. The other scores in the continuum include '4' for positive, '3' for neutral and '2' for negative. The respondents were categorized into different groups with their relative proportions expressed in percentages.

Focus group was formed in each of the selected blocks to develop a general understanding of stakeholders' perception on the potential information source for information dissemination among the rural communities with special focus on environmental aspects of rice cultivation. Focus group consisted of six to twelve participants in all the four blocks under study, so that the group was neither so large to preclude adequate participation by most members nor so small that it fails to provide substantially greater coverage than that of an interview with one individual. There was a moderator who was the investigator and an assistant moderator to report the discussion who was one among the progressive farmers of the area. The major steps followed in conducting this focus group discussion were detailed below.

(a) Established the purpose of the focus group, including its goals and desired outcome, which in this study was generating an idea on the most potential and reliable information source for dissemination of information on environmental aspects especially eco-friendly technologies in rice farming as perceived by the participant group and the role played by these sources at the time of the research study. Similarly the discussion also intended to generate an idea on the major factors that influence their group in information access.

(b) Prepared moderator's guide that served as a map to chart the course of the focus group interview from beginning to end. The moderator's guide included sections like (i) introduction (ii) warm-up (iii) term clarification (iv) questions to be asked (v) wrap-up (vi) member check and finally (vii) the closing statements for winding up session.

(c) Determined the number of focus groups, which in this study was one for each block.

(d) Since selection of location is very important in focus group formation, Krishi bhavans of the study area were selected considering its availability and accessibility to the group members in all the four cases.

After a detailed discussion consensus regarding the potential information sources and the factors influencing the access of information were arrived at. The discussion was properly reported and was finally considered for qualitative reporting. The method followed by Sivaramakrishnan (1981) was followed in this study with slight modifications.

RESULTS AND DISCUSSION

The quantified data is presented in Tables 1-4. A perusal of the Table 1 reveals that majority (42.5%) of the farmers considered direct experience to be the major factor strongly and positively influencing them in developing environmental concerns followed by a comparable 40 per cent reporting mass media to have very positively influenced them in developing environmental concerns. Other factors that had very positively influenced them were peer group, who were other farmers in their locality (30%) and literature (25%),

comprising of books, magazines, newspaper etc. A majority (60%) of the respondents were positively influenced by mass media in developing environmental concerns. Similarly more than half (52.5%) of the respondent farmers were found to be positively influenced by literature while a comparable 50 per cent were positively influenced by their peer groups.

It was revealed from the study that majority of the farmers were not influenced by external agents such as nature clubs (97.5%), internet (97.5%), teachers (90%), NGOs (87.5%) and extension personnel (82.5%) in developing environmental concerns. It was interesting to note that no respondents were negatively influenced by any of these agencies.

An examination of the Table 2 indicates that 32.5 per cent of the labourers were very positively influenced by mass media and 20 per cent each were influenced very positively by their direct experience and peer groups in developing and nurturing environmental concerns. Peer group and direct experience positively influenced 72.5 per cent of labourers, while 65 per cent reported that they were positively influenced by mass media in inculcating environmental concerns. Teachers (100%), NGOs (100%), nature clubs (100%), extension personnel (100%) and Internet (100%) had not exerted any influence in developing environmental concerns among this group. Literature (75%) too had played a very little role in influencing agricultural labourers.

Literature, direct experience and mass media/ peer group had very positively influenced 57.5 per cent, 50 per cent and 47.5 per cent of the extension personnel respectively (Table 3). NGOs positively influenced 52.5 per cent respondents while a comparable 50 per cent were influenced positively by mass media and peer groups in developing environmental concerns. Majority opined that Internet (75%), nature clubs (62.5%) and teachers (62.5%) had never influenced them.

The study evidently shows that among people's representatives/social activists, literature (55%), direct experience (47.5%) and peer group (35%) were found to have very positive influence in developing environmental concerns (Table 4). Eighty five per cent opined that mass media positively influenced them while a comparable 82.5 per cent were positively influenced by NGO's in developing environmental concerns. Majority reported that they were not influenced by extension personnel (100%), Internet (75%), nature clubs (57.5%) and teachers (55%). It was interesting to note that a small proportion (5%) of the respondents reported that they were sometimes very negatively influenced by advertisements in mass media and anti environment propaganda through Internet (2.5%).

In the focus group discussion of farmers they pointed out the immense potential of extension personnel (full time government staffs who were supposed to be the major player in the information dissemination process as was envisaged by the government) in propagating eco-friendly cultivation practices, environmental awareness and concerns among the farming community, which they said had not yet been undertaken by these agencies. The group opined that age of the farmers, gender, leadership and social participation were the major factors that influenced the access of information among farmers. The reasons they pointed out for substantiating this were: (1) young farmers were more active. With all modern gadgets available they were able to explore various information sources. But the old farmers had still inhibitions in using these modern technologies and were mostly dependent on conventional information sources, which were restricting their access to information on environmental aspects across the world. (2) With regard to women, they were burdened with multiple responsibilities, as they were working in three different roles of productive work (agriculture, livestock, fisheries, forestry etc.), household work and caring work. They got little leisure, which restricted them in accessing any of the information sources other than mass media, which they listened to even while doing their household chores. (3) People with leadership traits and those who were actively engaged in social activities had more opportunities to interact with people from different walks of life, which helped them in gaining information. Being leaders they collected such information and disseminated to their peer groups.

Table 1. Extent of influence exerted by various agencies in developing environmental concerns in farmers (n=40)

Category	Teachers		NGOs		Literature		Peer group		Direct experience		Nature club		Mass media		Extension personnel		Internet	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%
Very Positive	1	2.5	1	2.5	10	25	12	30	17	42.5	1	2.5	16	40	3	7.5	1	2.5
Positive	3	7.5	4	10	21	52.5	20	50	11	27.5	0	0	24	60	4	10	0	0
Neutral	36	90	35	87.5	9	22.5	8	20	12	30	39	97.5	0	0	33	82.5	39	97.5
Negative	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Very negative	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2. Extent of influence exerted by various agencies in developing environmental concerns in agricultural labourers (n=40)

Category	Teachers		NGOs		Literature		Peer group		Direct experience		Nature club		Mass media		Extension personnel		Internet	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%
Very Positive	0	0	0	0	0	0	8	20	8	20	0	0	13	32.5	0	0	0	0
Positive	0	0	0	0	10	25	29	72.5	29	72.5	0	0	26	65	0	0	0	0
Neutral	40	100	40	100	30	75	3	7.5	3	7.5	40	100	1	2.5	40	100	40	100
Negative	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Very negative	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 3. Extent of influence exerted by various agencies in developing environmental concerns in extension personnel (n=40)

Category	Teachers		NGOs		Literature		Peer group		Direct experience		Nature club		Mass media		Internet		Internet	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%
Very Positive	7	17.5	15	37.5	23	57.5	19	47.5	20	50	0	0	19	47.5	5	12.5	7	17.5
Positive	8	20	21	52.5	16	40	20	50	19	47.5	15	37.5	20	50	5	12.5	8	20
Neutral	25	62.5	4	10	1	2.5	1	2.5	1	2.5	25	62.5	1	2.5	30	75	25	62.5
Negative	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Very negative	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 4. Extent of influence exerted by various agencies in developing environmental concerns in people's representatives /social activists (n=40)

Category	Teachers		NGOs		Literature		Peer group		Direct experience		Nature club		Mass media		Extension personnel		Internet	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%
Very Positive	1	2.5	3	7.5	22	55	14	35	19	47.5	3	7.5	4	10	0	0	4	10
Positive	17	42.5	33	82.5	14	35	23	57.5	19	47.5	14	35	34	85	0	0	5	12.5
Neutral	22	55	4	10	4	10	3	7.5	2	5	23	57.5	0	0	40	100	30	75
Negative	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2.5
Very negative	0	0	0	0	0	0	0	0	0	0	0	0	2	5	0	0	0	0

In case of agricultural labourers they felt that other than mass media and peer groups no agencies were trying to pass on any kind of information to them. They specifically pointed out that no agricultural labourers had ever been given any training on environmental / conservation aspects, compared to the other categories of respondents. The trainings organized by the mainstream agencies usually focused on training farmers and neglected the labour groups. The farmers who were trained did not supervise and preferred to keep away from the field that the technologies did not reach these category of stakeholders or the field. Majority of agricultural labourers in rice being women were burdened with their triple roles, which reduced their access to information. Labourers especially men who had better social participation had better access to information sources. Both the farmer group and labourer group pointed out that class had a considerable role on information access among these categories.

In the focus group discussion with extension personnel it became very clear that ICT tools could play a major role in dissemination of sustainable and eco-friendly farming techniques which was not yet explored completely. They also agreed on the immense potential they had, for being the pinheads of transformation in the field of eco-friendly agriculture. But time constraint due to administrative works prevented them from spending time with the farming communities. They opined leadership traits and participation in community activities to be the major factors that determined the interest for accessing information.

Group of people's representatives/social activists also commented on the role of ICT in information dissemination and the need for such initiatives at the village level as they thought it would be a new subject to the farming community. They also agreed upon their role and the role of extension personnel in disseminating information on environmental aspects of rice farming. This group commented that age, education, gender, class, leadership and social participation had an important role to play in the way this stakeholders accessed information. All the groups specifically mentioned on the role of mass media in inculcating environmental awareness as this means of mass communication had reached every nook and corner of the study area.

To summarize the results, direct experience and mass media had very positively influenced the process of developing environmental concerns of farmers and agricultural labourers respectively. In case of extension personnel and peoples' representatives/social activists, literature had very positively influenced them. This is in accordance with the study of Blobaum (1983) who stated that most of the organic technologies were accessed only through non-traditional sources like books, magazines and neighbours. But in this study it became further clear that the access to information sources varied among different categories of stakeholders based on their age, gender, class, leadership, social participation, education etc. As the last two categories were educated (100% in case of extension personnel and peoples' representatives/social activists of which 75% had above high school level education), literature had influenced them to a greater extent, whereas majority of the labourers in rice farming who were functionally illiterate (60%) and women (75%) were more dependent on mass media that had a visual impact. This might be the reason for predominant role of mass media in developing environmental concerns and this portrays the extent of penetration of media among the rural masses. Farmers were of the opinion that their own experience of excessive use of inorganic inputs and its repercussions that were visible to them was yet another major factor in developing environmental concerns which is supporting the study of Lukas and Cahn (2008) who observed that the major motivation for the respondent farmers to adopt organic agriculture was their negative experiences with conventional farming, e.g. deteriorating natural assets, continuous pest and disease problems, high costs for external farm inputs, and health problems that were related to the use of pesticides.

It is very clear from the results that though an era of information technology the reachability of these technologies, especially Internet was very low among the rice farmers of Palakkad. Study of Kallas *et al.* (2009) indicated the

relevance of Internet in agriculture and stated that those farmers who tend to use internet technology when managing the farm were influenced positively in their decision to convert to organic farming. Even though IT can play a major role in facilitating the process of transformation of rural India to meet these environmental challenges, remove the fast growing digital divide and encourage sustainable farming practices it is still the least explored for transfer of technology in agriculture sector. For the agricultural labourers Information Technology was still an unfamiliar subject. But it was very bizarre to note that majority of the extension personnel were still not using Internet for accessing information. It's high time these categories of respondents, who are the pinheads of technology transfer, update their information pertaining to agriculture making use of these facilities that even fits into their pockets now a day.

It is crystal clear from the study that the influence of extension personnel was very less in the case of farmers and even nil in the case of labourers in propagating the ideas of sustainability in rice farming. The reason as many opined was the time constraint, which prevented the extension workers (agriculture officers and assistants) from spending time with the farming communities. Most of them were tied up with office works, which was mostly restricted to subsidy distribution, book keeping and implementation of government schemes. In this context the study of Agunga and Igodan (2007) is highly relevant, in which they observed that farmers practicing sustainable agriculture had a strong interest in extension and almost 68 per cent of respondents expressed interest in extension information on the environment; but only about 30 per cent of respondents felt extension educators know enough about sustainable agriculture to help them and understand what organic farmers needed. Wei *et al*. (2009) too recommended the promotion of farmer education and strengthening of extension services as the best policy strategies for improving environmental management. All these results further stress the need for strengthening extension services. The extension personnel, being the field staffs need to sharpen their knowledge and information base with the help of Information Communication Technology tools available.

NGOs did not have any role in influencing the farmers and agricultural labourers as there were no such agencies functioning in the locality or near by areas. Only a few innovative farmers had access to the services of such agency whereas the other two stakeholders were getting enough services through these organizations mostly as trainings as they had better mobility and exposure compared to the farmers and agricultural labourers.

CONCLUSIONS

Various agencies influence the stakeholders of rice farming in developing concerns for environment at different phases of their life, which is highly significant in the eco-system upkeep. Findings have shown that there were many reasons why a particular agency was influencing a category of stakeholders. The major findings of the study were

- Direct experience and mass media had very positively influenced the process of developing environmental concerns of farmers and agricultural labourers respectively.
- In case of extension personnel and peoples' representatives/social activists, literature

followed by direct experience had very positive influence in developing environmental concerns.

As the last two categories mentioned were educated, literature could have influenced them to a greater extent, whereas majority of the labourers who were illiterate were more dependent on mass media that had a visual impact. It is also clear from the study that reachability of internet and its use was very less even in the case of extension personnel who were supposed to be the knowledge providers for the farming community. It's high time we developed new extension education strategies to achieve sustainable objectives rather than sticking on to conventional methods.

Technological progress achieved in the areas of Information Communication Technologies (ICT) improved the potential of dissemination of knowledge across the globe. There are many successful models of application of ICT in different facets of development in the last

decade. ICT in agriculture is an emerging field and focus on the enhancement of agricultural and sustainable rural development through improved information and communication processes. The role of ICT to enhance agricultural productivity and support rural livelihoods without any harm to the environment is increasingly recognized now days. In this technological era we have to mainstream Information Communication Technology into various sub-sectors of agriculture like environmental extension, agriculture, market, rural finance etc through Village Resource Centre/Village Knowledge Centre initiatives that provide need-based locale-specific, demand driven information to the local communities for improving their livelihoods while ensuring environmental sustainability. Both ICT tools and conventional information dissemination mechanisms can be adopted to provide knowledge through these centres. Village resources cum farmer counseling centres are very important in dissemination of information to the rural communities. Every panchayat should have a knowledge centre through which information could be disseminated. These knowledge centers are to be networked to the Village Resource Centre at the district head quarters. This network will allow the local communities to access scientific and technical knowledge from experts anywhere in the world thereby ensure a sustainable livelihood option. This concept, conceived by Prof. M.S. Swaminathan and implemented by M.S. Swaminathan Research Foundation has gained international appreciation and has been showcased as one of the best models of ICT integrated rural development. Knowledge is a pre-requisite for progress of human society and acquisition of knowledge is essential for sustainable development and human wellbeing.

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