

Analysis of Socio-personal Characteristics of Adopters of Resource Conservation Technologies (RCTs) Under Rice Cultivation in Manipur

Sony Devi¹, A.K. Singha², R. Bordoloi³, P.C. Jat⁴, J.K. Singha⁵ and M. Devi⁶

ICAR-Agricultural Technology Application Research Institute, Zone-VII, (Umiam),
Barapani 793103, Meghalaya, India

E-mail:¹<sonykshetri@gmail.com>, ²<arunkumar_singha@yahoo.co.in>,
³<rmbshl@rediffmail.com>, ⁴<jat4pc@gmail.com>, ⁵<joykumarsinghk@rediffmail.com>,
⁶<merinadevi.90@gmail.com>

KEYWORDS Innovation Proneness. Imphal West. Mean Score. Social Participation

ABSTRACT The present study with the primary objective to ascertain socio-personal, economic, communication and psychological characteristics of the farmers who have been practicing resource conservation technologies in rice cultivation was carried out in the Imphal West district of Manipur state in India. A total of 120 rice growers were selected as respondents through proportionate random sampling from 10 selected villages of the district. Data collection from the selected respondents was made with the help of pre-tested structured schedule through personal interview method. The study shows that out of 120 respondents, the majority was of middle age with medium education level and high social participation in case of their personal characteristics. Majority respondents were marginal farmers and they belonged to medium category of annual income, that is, between INR 32,285 to INR 165,066 under economic characteristics. In case of communication variables, most of the respondents had medium level of extension contact and mass media exposure. The findings also indicated that over half of the respondents had possessed medium level of economic motivation, risk orientation, innovation proneness, attitude towards RCTs and knowledge about RCTs in their farming system.

INTRODUCTION

The overriding concern over sustainability in agriculture is one of the most important phenomena during the recent years, which in simplest term focus on sustainability of production and productivity over an extended scale of time and space. This essentially means that crop production and economic gains would flourish over a period of time, almost indefinitely and globally. During recent years, Indian agriculture has witnessed spectacular advances in the food grain production and productivity, which plays a significant role in the overall socioeconomic fabric of the nation. According to Economic Survey 2016-2017, the real Gross Domestic Product (GDP) growth of India at constant (2011-2012) prices in the year 2016-2017 was estimated at 7.11 percent and is expected to be between 6.75

and 7.50 percent in 2017-2018 in which, growth rate for the agriculture and allied sectors is estimated to be 4.1 percent for 2016-2017 (Anonymous 2016-17).

Intensive agriculture and excessive use of external inputs among others, contribute to this significant growth, which in turn, lead to degradation of soil, water and genetic resources. The modern farming systems aim at maximizing production through the use of increased quantities of external inputs such as fertilizers and plant protection chemicals without due consideration to their ill effects. These adverse effects are manifested through shortage of water, degradation of soil health, deterioration of water quality, emission of greenhouse gases (GHGs) such as methane causing global warming and pollution.

The concerns for ensuring food security through sustainable agriculture and growing resource degradation problems worldwide have emerged the concept of conservation agriculture (CA) as an alternative strategy to sustain agricultural production and productivity. Conservation agriculture is based on the principle

Address for correspondence:

A. K. Singha

Principal Scientist

E-mail: arunkumar_singha@yahoo.co.in

of enhancing natural biological process in such a way and quantity that mechanical soil tillage and use of external inputs are reduced to an absolute minimum to avoid interference with or disrupt the biological processes. It has been widely recognized that intensive and conventional agricultural farming in the northeastern region of India cause continuous degradation of natural resources, posing a serious threat to the sustainability of agriculture. Resource Conservation Technologies (RCTs) using locally available resources encompass practices that enhance resource and inputs use efficiency and thus provide immediate, identifiable and demonstrable economic benefits such as reduction in production costs, water saving, fuel, labor requirements and timely establishment of crops resulting in improved yields. RCTs are generally cost reducing and efficient inputs-use without yield loss, thereby enhancing farmers' income higher than conventional practices (Singh and Singh 2011; Singh et al. 2012). However, the credibility of any agricultural innovation lies in its mass adoption by the farmers. The past studies also recognized that adoption of an innovation is undoubtedly associated with the socioeconomic, communication and psychological characteristics of the farmers. Their key environmental and socioeconomic factors have significant influence towards adoption and diffusion of agriculture technologies (Lestrelin et al. 2012).

The purpose of this study, therefore, is to generate information on some selected personal, socioeconomic, communication and psychological characteristics of the farmers who have been practicing resource conservation technologies in rice cultivation and understanding these characteristics would also directly help to judge the innovation-decision style in a social system.

METHODOLOGY

The present study was carried out in Imphal West district of Manipur state of India, which comprises of two agricultural sub-divisions namely, Imphal West-I and Imphal West-II. A list of villages where farmers were commonly using resource conservation technologies such as System of Rice Intensification (SRI), Conservation Tillage, in-situ residue management and use of bio-agents and bio-fertilizers, in rice cultivation from each sub-division was prepared separately in consultation with available literature,

office records/reports, through PRA, different NGOs, progressive farmers as well as extension personnel of Department of Agriculture, Government of Manipur. These villages were ranked separately for each sub-division based on number of adopted farmers and area coverage under RCTs through participatory methods. Finally, 5 (five) villages according to their rank orders were selected from each of the sub-division for the study. A total of 60 respondents from 5 selected villages from each sub-division were selected through proportionate random sampling method. This makes a total of 120 respondents as the final size of sample. The independent variables of age, education and social participation were measured with the help of scales developed by Trivedi and Pareek (1964). The variables of size of operational land holding, annual income, extension contact and mass media exposure were measured with the help of schedules structured for the study. The psychological variables namely, economic motivation, risk orientation and innovative proneness were measured with the help of scales developed by Parani Kumar (1999), Supe (1969) and Moulick and Rao (1965). The scale was constructed by the judges' rating to measure the variables, attitude towards resource conservation technologies (RCTs) and knowledge about RCTs.

RESULTS AND DISCUSSION

Socio-personal, Economic, Communication and Psychological Characteristics of the Respondents

A. Socio-personal Characteristics

The distribution of respondents according to their socio-personal characteristics is given in Table 1.

Age

From Table 1, it is observed that over half of the respondents (52.50 %) belonged to the middle age (36 to 50 years) category followed by the old (42.50%) aged from 51 to 72 years and young group (5.00%) aged from 27 to 35 years. This indicates that middle and old age farmers preferred more than young farmers in farming activities. The youth in general were interested in

government jobs, business and other occupations compared to farming activities. The findings are in conformity with that of the studies conducted by Shashidhara (2006) and Mangala (2008). Onyeneke (2017) in his study on adoption of improved technologies in rice production in Imo State, Nigeria also revealed that majority farmers (60.74%) belonged to the middle age category with age between 41 and 50 years, while only 4.44 percent of the total respondents belonged to the young category with the age ranging from 31 to 40 years.

Education

With regard to the educational level, majority respondents (43.33%) had medium level of formal education attaining either, high school or higher secondary. This was followed by high level (31.67%) with graduate/diploma or above and low (23.33%) having primary or middle school level of education. Only 1.67 percent respondents were illiterate in the study area. This study indicates that farmers, by and large, in the study area were found having medium to high level of education, possibly due to the realization of importance of formal education by the respondents' parents and the increase importance of literacy and facilities available. The other factors attributed to this were availability of good numbers of schools in nearby towns with transportation and communication facilities. The findings are on the same lines as reported by Gohain (2006) and Singha et al. (2016).

Social Participation

It is noticed from the table that majority (43.33%) respondents were found in high social participation category with most of the respondents' associated in more than two organizations and office holders followed by no participation (30.00%) in any of the organization. While 20 percent and 5.84 percent respondents had low and medium participation categories, respectively. The mean value of 2.50 signifies that respondents in general involved in most of the social activities. The reason for this might be due to good education level (medium to high) of the respondents and understanding the importance of involving in social activities. Contrary to the findings, Santosh et al. (2017) observed that majority (70.83%) of the self-help group members belonged to the medium level of social participation.

B. Economic Characteristics

The findings with respect to economic characteristics of the respondents are presented in Table 2. A brief explanation on the selected variables is given below.

Size of Operational Landholding

The data presented in Table 2 show that majority (70.83%) of the respondents were

Table 1: Distribution of respondents according to their socio-personal characteristics (N=120)

S. No.	Category	Socio-personal variables				
		Score range	Frequency (f)	Percentage (%)	Mean	S.D.
I.	Age					
1.	Young	27-35	6	5.00	50.20	9.06
2.	Middle	36-50	63	52.50		
3.	Old	51-72	51	42.50		
	Total		120	100.00		
II.	Education					
1.	No education	0-1	2	1.67	3.53	1.25
2.	Low	1-3	28	23.33		
3.	Medium	3-5	52	43.33		
4.	High	5-6	38	31.67		
	Total		120	100.00		
III.	Social Participation					
1.	No participation	0-1	36	30.00	2.50	2.30
2.	Low participation	1-2	25	20.83		
3.	Medium participation	2-3	7	5.84		
4.	High participation	3-7	52	43.33		
	Total		120	100.00		

Table 2: Distribution of respondents according to their economic characteristics (N=120)

S. No.	Category	Range	Economic variables			
			Frequency (f)	Percentage (%)	Mean	S.D.
I.	Size of Operational Land Holding					
1.	Marginal	Up-to 1.0 ha	85	70.83	1.11	0.87
2.	Small	1.01-4.0ha	33	27.50		
3.	Large	above 4.0 ha	2	1.67		
	Total		120	100.00		
II.	Annual Income					
1.	Low	Rs. 25,900-Rs. 33,280	3	2.50	99,174	65,892
2.	Medium	Rs. 33,281-Rs. 1,65,066	105	87.50		
3.	High	Rs.1,65,067-Rs. 4,00,00	12	10.00		
	Total		120	100.00		

marginal famers possessing landholding size of up to 1.0 hectare. It may be because of prevailing traditional norms of distribution of the parental landed property among the sons. Under small farmers category of landholding, 27.50 percent with landholdings were having 1.01 to 4.0 hectares of land. Only 1.67 percent respondents belonged to the large category (≥ 4.0 ha).

Annual Income

It can be observed from the table that as many as 87.50 percent respondents belonged to the medium category of annual income (INR 33,281 to INR 165,066) from all sources. This was followed by high category (10.00%) with annual income above INR 165,066 and low (2.5%) with income less than INR 33,281 per year. It is learnt from these findings that most of the farmers in the study area were engaged in different non-farm activities as their primary occupation for regular employment and income. The results are in conformity with the results of the study conducted by Raghavendra (2005).

C. Communication Characteristics

The distribution of respondents according to their communication characteristics is given in Table 3.

Extension Contact

It is evident from Table 3 that two thirds of the respondents (66.66%) had medium level of extension contact with extension personnel, that is, the Agriculture Development Officer, VLEW, Agricultural Scientist/ Professional, KVK Scientist, Input dealers or agents for seeking various advices and suggestions related to crop production, plant protection measures, soil health and nutrient management. While equal numbers of respondents (16.67%) were found to have low and high extension contact for the same purposes in farming activities. The results are in conformity with the results of the study conducted by Singha et al. (2016) and Sharma et al. (2017).

Table 3: Distribution of respondents according to their communication characteristics (N=120)

S. No.	Category	Communication variables				
		Score range	Frequency (f)	Percentage (%)	Mean	S.D.
I.	<i>Extension Contact</i>					
1.	Low	0-1	20	16.67	5.11	3.55
2.	Medium	2-8	80	66.66		
3.	High	9-15	20	16.67		
	Total		120	100.00		
II.	<i>Mass Media Exposure</i>					
1.	Low	3-4	12	10.00	6.11	1.66
2.	Medium	5-7	89	74.17		
3.	High	7-12	19	15.83		
	Total		120	100.00		

Mass Media Exposure

It is evident from the table that majority of the respondents (74.17%) had medium level of mass media exposure followed by high (15.83%) and low (10.00%) levels. The mean score of 6.11 denotes that most of the respondents had medium to high level of mass media exposure especially to regular agricultural programs on radio, television, farm magazines, bulletins and newspapers. The results are in conformity with the results of the study conducted by Singha et al. (2016) and Sharma et al. (2017).

D. Psychological Characteristics

The results with respect to psychological characteristics of the respondents have been presented in Table 4. The highlights of the findings are given below.

Economic Motivation

Table 4 shows that half of the respondents (50.00%) had medium level of economic motiva-

tion. This was followed by high (25.83%) and low (24.17%) categories, respectively. The corresponding mean score of 26.50 indicates that the sample farmers, by and large, had medium to high level of economic motivation. The findings are in line with the findings of Raghavendra (2005), Shashidhara (2006) and Kumar (2009).

Risk Orientation

Table 4 also indicates that risk orientation of the majority (66.67%) of the respondents was medium whereas, 20.00 percent were low and 13.33 percent were in the high level category. The mean score of 22.23 also clearly indicates that majority respondents had low to medium level of risk orientation, particularly in adoption of RCTs in rice cultivation due to their wrong perception of low production and productivity levels of rice as compared to the conventional method. Therefore, extension agencies should conduct as many as demonstration and on-farm trials on resource conservation practices to convince farmers about the benefits of adopting resource conservation practices. The results are supported by the findings of Shashidhara (2006).

Table 4: Distribution of respondents according to their psychological characteristics (N=120)

S. No.	Psychological variables					
	Category	Range	Frequency (f)	Percentage (%)	Mean	S.D.
I. Economic Motivation						
1.	Low	21-24	29	24.17	26.50	2.40
2.	Medium	25-28	60	50.00		
3.	High	29-30	31	25.83		
	Total		120	100.00		
II. Risk Orientation						
1.	Low	16-19	24	20.00	22.23	2.96
2.	Medium	20-25	80	66.67		
3.	High	26-30	16	13.33		
	Total		120	100.00		
III. Innovation Proneness						
1.	Low	18-22	22	18.33	26.20	3.787
2.	Medium	23-29	74	61.67		
3.	High	30-34	24	20.00		
	Total		120	100.00		
IV. Attitude towards RCTs						
1.	Less favourable	25-30	8	6.67	34.78	3.87
2.	Favourable	31-38	84	70.00		
3.	More favourable	39-43	28	23.33		
	Total		120	100.00		
V. Knowledge about RCTs						
1.	Low	35-45	51	42.50	46.63	5.14
2.	Medium	45-55	62	51.67		
3.	High	55-60	7	5.83		
	Total		120	100.00		

Innovation Proneness

Table 4 reveals that majority (61.67%) of respondents had medium level of innovation proneness followed by high (20%) and low level of innovation proneness (18.33%). The high mean score 26.20 reflects that the farmers of the area had medium to high level of innovation proneness. The findings are in accordance with the findings of Kumar (2009).

Attitudes Towards RCTs

From the table, it is seen that 70.00 percent of the respondents had a favorable attitude towards RCTs followed by more favorable (23.33%) and less favorable attitudes (6.67%), respectively. The calculated mean score of 34.78 indicates that overall farmers had a favorable to more favorable attitude towards adoption of RCTs in rice cultivation. Further investigation on this variable revealed that most of the middle-aged farmers had a more favorable attitude compared to old farmers towards RCTs. The findings of the study are in agreement with the results of Marradi (2006) and Kalita et al. (2017).

Knowledge About RCTs

With regard to knowledge on RCTs application, it is seen from Table 4 that over half of the respondents (51.67%) had medium level of knowledge towards resource conservation technologies in rice cultivation. While 42.50 percent and 5.83 percent respondents had low and high level of knowledge respectively, of resource conservation practices in rice cultivation. The mean value of 46.63 indicates that by and large, farmers in the study area had low to medium level of knowledge on resource conservation technologies in rice cultivation. Sharma et al. (2017) in their study on farmers' knowledge towards aerobic rice cultivation also reported that majority of the respondents (58.33%) had medium level of knowledge on aerobic rice cultivation practices. It is reported from the present study that the concept of resource conservation technologies in agriculture despite gaining its popularity among the farmers, its systematic and scientific application were not properly trained under different farming situations. This calls for hand-on training programs for farmers by the experts in real farm situation to improve their knowledge and skills on RCTs. The findings of the study are in agreement with the results obtained by

Naik (2005), Thippeswamy (2007), Kumar (2009), Singha et al. (2016) and Kalita et al. (2017).

CONCLUSION

It could be concluded from this study that the adopters of resource conservation technologies in rice cultivation in Imphal West district of Manipur were middle aged having medium level of education and medium social participation. The study further revealed that a majority of the farmers was having marginal landholding and had medium level of annual income from all farm and non-farm activities. Regarding communication and psychological characteristics, a large chunk of the respondents had medium level of economic motivation, risk orientation, innovation proneness, favorable attitude towards RCTs and medium level of knowledge on RCTs. The analyses further showed that the characteristics like education, extension contact, economic motivation, risk orientation, innovation proneness, attitude towards RCTs and knowledge about RCTs application in different farming systems are indicators of symbolic adoption of resource conservation technologies in rice cultivation.

RECOMMENDATIONS

The major findings of the present study have a measure of implications for concerned stakeholders including extension workers, agricultural scientists, Krishi Vigyan Kendras, and NGOs. The study, therefore, suggests that there is need for organizing mass awareness camps, field days, exhibitions and workshops on various important aspects of RCTs and their role in the changing agricultural scenario and global concern about environmentally sustainable agricultural growth. The government assistance and pro-actions through concerted efforts and coordination with allied departments, agencies and NGOs are of paramount importance to promote the popularization of farming by using RCTs particularly in rice cultivation. Efforts must be taken through different training programs, banking and marketing initiatives to strongly uplift the socioeconomic security of the farmers in the region.

REFERENCES

- Anonymous 2016-17. *Economic Survey*. Department of Economic Affairs, Ministry of Finance, Government of India, January, 2017.

- Gohain J 2006. *Adoption of Organic Farming Practices in Vegetable Crops in Upper Brahmaputra Valley Zone (UBVZ) of Assam*. MSc (Agri.) Thesis, Unpublished. Jorhat: Assam Agricultural University.
- Kalita RR, DuttaDas M, Bora S 2017. Knowledge, attitude and practices of farmers towards vermiculture technology. *Indian Res J Ext Edn*, 17(4): 78-82.
- Kumar S 2009. *A Study on Technological Gap in Adoption of the Improved Cultivation Practices by the Soyabean Growers*. MSc (Agri.) Thesis, Unpublished. Dharwad: University of Agricultural Sciences.
- Lestrelin Guillaume, Nanthavong Khanla, Jobard Etienne, Keophoxay Anousith, Lienhard Pascal, Khambansenang Chanxay, Castella Jean Christophe 2012. To till or not to till? The diffusion of conservation agriculture in Xieng Khouang Province, Lao PDR opportunities and constraints. *Outlook on Agriculture*, 41(1): 41-49.
- Mangala B 2008. *Impact of Integrated Farming System on Socio-economic Status of Bharatuya Agro-industries Foundation (BAIF) Beneficiary Farmers*. MSc (Agri.) Thesis, Unpublished. Dharwad: University of Agricultural Sciences.
- Maraddi GN 2006. *An Analysis of Sustainable Cultivation Practices Followed by Sugarcane Growers in Karnataka*. PhD Thesis, Unpublished. Dharwad: University of Agricultural Sciences.
- Moullick TK, Rao CSSC 1965. *Measurement in Extension Research Instrument*. IARI. New Delhi: Division of Agricultural Extension.
- Naik RD 2005. *A Study on Knowledge and Adoption Pattern of Improved Sugarcane Practice in Bihar District*. MSc (Agri.) Thesis, Unpublished. Dharwad: University of Agricultural Sciences.
- Onyeneke RU 2017. Determinants of adoption of improved technologies in rice production in Imo State, Nigeria. *African Journal of Agricultural Research*, 12(11): 888-896.
- Parani Kumar KSRP 1999. *Yield Gaps and Constraints to High Yields of Cotton in Lower Palani Hills*. MSc (Agri.) Thesis, Unpublished. Tamil Nadu: Annamalai University.
- Raghavendra HN 2005. *A Study on Knowledge and Adoption Behaviour of Arecanut: Practices by Small Farmers in Location Specific Technology Blocks of Kolar District in Karnataka*. MSc (Agri.) Thesis, Unpublished. Bangalore: University of Agricultural Sciences.
- Santosh SP, Manish N, Sawant, Sadashive SM, Pordhiya KI, Ramesh N 2017. Study of socio-economic and psychological characteristics of self-help group members. *Indian Res J Ext Edn (Special issue on Veterinary Research & Extension)*, 97-100.
- Sharma K, Dhaliwal NS, Rampal VK 2017. Farmers' knowledge towards aerobic rice cultivation in Muktsar District of Punjab. *Indian Res J Ext Edn*, 17(4): 83-86.
- Shashidhara 2006. *A Study on Management of Eco-friendly Practices by Vegetable Growers of North Karnataka*. PhD Thesis, Unpublished. Dharwad: University of Agricultural Sciences.
- Singh N, Singh RP 2011. Adoption of resource conservation technologies in Indo-Gangetic Plains of India: Scouting for profitability and efficiency. *Agricultural Economics Research Review*, 24(1): 15-24.
- Singh R, Erenstein O, Yaspal S, Chaudhary S, Jat ML 2012. Adoption analysis of resource conserving technologies in rice (*Oryza sativa* L.) -wheat (*Triticum aestivum* L.) cropping system of South Asia. *Indian Journal of Agricultural Sciences*, 82(5): 15-19.
- Singha AK, Bordoloi R, Jat PC, Singha JK Devi M 2016. Socio-economic profile of the common adopters of improved practices of crops and livestock enterprises and their problems and suggestive measures - A case study in adopted and non-adopted villages in North Eastern India. *Economic Affairs*, 61(2): 289-298.
- Supre SV 1969. *Factors Related to Different Degrees of Rationality in Decision-making among Farmers in Buldana District*. PhD Thesis, Unpublished. New Delhi: Indian Agricultural Research Institute.
- Thippeswamy R 2007. *A Study on Knowledge and Adoption of Plant Protection Measures in Coconut Cultivation by Farmers of Chitradurga District*. MSc (Agri.) Thesis, Unpublished. Dharwad: University of Agricultural Sciences.
- Trivedi G, Pareek U 1964. *Socio-economic Status Scale (Rural)*. New Delhi: Manasyan.

Paper received for publication on August 2015
Paper accepted for publication on December 2017