

Adoption and Discontinuation of Innovative Agricultural Technology by the Farmers of NICRA Village in Cooch Behar District

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ABSTRACT

New agricultural technologies are need to increasing the production and productivity of agricultural crops. Technological change has been the major driving force for increasing agricultural productivity and promoting agriculture development in India. It was found from different study that farmers' perceptions of technology characteristics significantly affect their adoption decisions. The new technology may be change by the farmers according to their social, demographic, agro-climatic or other factors. The technology which was adopted at one time may be discontinuing in other time in different way. There are many old technologies which are still using by the farmers. The study was conducted at Khagribari Village (NICRA village), Cooch Behar District, West Bengal during April to September, 2017. The objective of the study was to know the adoption and discontinuation of agricultural technology by the farmers with respect to their socio-economic character. Random sampling method was used for selection of respondent. Explorative Research design and both parametric and nonparametric statistical test were followed for conducting and analysing the study. The study was explored the relation between the adoption of innovative agricultural technology with different independent variable and the factor associate for discontinuation of innovative agricultural technology.

Key words: Adoption; Discontinuation; Agriculture; Technology; Innovative; NICRA;

A major role of agricultural extension in developing countries has been to disseminate technologies generated by public sector research organisations through appropriate dissemination strategies such as demonstrations, field visits, farmers' meetings, use of media etc. Agricultural extension had played an important role in promoting Green Revolution technologies in South Asia. Different technologies are implemented by the different organisation for increasing the agriculture production. But it was found from different study that at implementation stage there may be technological discontinuation take place. Rao and Rao (1996) found a positive and significant association between age, farming experience, training received, socioeconomic status, cropping intensity, aspiration, economic motivation, innovativeness, information source utilization, information source, agent credibility and

adoption. Arene (1994) reported a positive and significant relationship between family size and adoption. Abdul et al. (1993) reported a significant relationship between landholdings (farm size) and adoption. Voh (1982) also reported that socio-economic status of farmers is positively and strongly related to adoption. This report implied that the higher the socio-economic status, the higher the tendency to adopt innovation. Igodan, et al. (1988) reported that farmers who are more exposed to formal extension information have a high propensity towards adoption than those with less exposure. However, Voh (1982) did not establish any relationship between education and adoption. Rogers (2003) reported two types of discontinuance which can be replacement discontinuance that is rejecting an idea in order to adopt a better one that supersedes it or disenchantment discontinuance when a decision to reject

an idea as a result of dissatisfaction with its performance. *Leuthold (1967)* concluded that the rate of discontinuance was as important as the rate of adoption in determining the level of adoption of an innovation at any particular time. *Ogunfiditimi (1993)* used the term “abandoned adoption” to describe discontinued use of previously adopted innovation. The objective of the study was to find out the technology adoption and discontinuation at farmers’ field and relation of adoption and discontinuation technology with the socio-economic conditions of the farmers.

METHODOLOGY

The study was conducted at Khagribari Village (NICRA village) Coochbehar district, West Bengal, during April to September, 2017. A pre-tested Semi-structure interview schedule was used for collection of data. Explorative research design was used at the time of investigation. Random sampling method was used for selection of respondents. The sample size was 50. The variables were selected based on recommendation of the scientists of Cooch Behar KVK. The dependent variables of this study were adoption and discontinuation of agricultural technology and independent variables were age, gender, migration, annual income, land holding, education, occupation, family type, religion, caste, land type. The descriptive statistics like frequency, percentage, range and pearson product-moment correlation were used for the investigation.

RESULTS AND DISCUSSION

It was observed from the study (Table 1) that the majority percentage of the respondent educational level at the time of survey was primary school pass (62%) pass followed by Secondary school pass (32%). It was found from the study that 100 per cent of the respondents were male and major occupation was farming. It was found from the investigation that majority of the respondents (72%) land holding size were more than 2 acre followed by 1 to 2 acre (18%) and less than 1 acre (10%). It was shown from the result majority of the respondent land holding size were large followed medium and small. It was observed that 48 per cent of the respondents land types were midland followed by upland (36%) and lowland (16%). It was found from the survey that majority of the respondents age range were 30 to 50 years (54%) followed by above 50 years (36%). It

Table 1. Socio-economic profile of the respondent (N=50)

| Variable | Category | No. | % |
|---------------|------------------------|---------|-----|
| Age | Below 35 years | 5 | 10 |
| | 35-50 Years | 27 | 54 |
| | Above 50 years | 18 | 36 |
| Gender | Male | 50 | 100 |
| | Female | 0 | 0 |
| Migration | Before NICRA | 25 | 50 |
| | After NICRA | 5 | 10 |
| Annual Income | Before NICRA | 60,000 | |
| | After NICRA | 100,000 | |
| | 66.66 % change from BM | | |
| Land Holding | Less than 1 acre | 5 | 10 |
| | 1-2 acre | 9 | 18 |
| | More than 2 acre | 36 | 72 |
| Education | Primary | 31 | 62 |
| | Secondary | 16 | 32 |
| | High Secondary | - | - |
| | Graduation | 3 | 6 |
| Occupation | Farming | 50 | 100 |
| | Business | - | - |
| | Labour | - | - |
| | Govt. Service | - | - |
| Family Type | Private Service | - | - |
| | Joint | 45 | 90 |
| | Nuclear | 5 | 10 |
| Religion | Hindu | 40 | 80 |
| | Muslim | 10 | 20 |
| Caste | GEN | 6 | 12 |
| | SC | 16 | 32 |
| | ST | 5 | 10 |
| | OBC | 23 | 46 |
| Land Type | Low land | 8 | 16 |
| | Middle land | 24 | 48 |
| | Upland | 18 | 36 |

was exposed from the result that majority of the respondent were middle age group. It can be revealed from the study that middle age group of respondents were more involve in farming activity. It was shown from the investigation that majority of the respondents religion were Hindu (80%) followed by Muslim (20%). So policy may be taken by government or private organization which is not harmful on religion. It was clear from the study (Table 1) that majority of the respondents caste were OBC (46%) followed by SC (32%) and General (12%) category. It was found from the study that the great percentage of the respondent family types were joint (90%) followed by nuclear

(10%). It was exposed from the study that majority of the respondent family size were small. It can be say from the study that respondent belong in joint family were get more time to adopt the innovative agricultural technology. It was revealed from the study that before NICRA Project at Khagribari Village 50 per cent respondents were temporary migrated for occupational purpose and after NICRA Project only 10 per cent of the respondents were temporary migrated. It was also shown from the study that after NICRA project farmers' income increases upto 66.66 per cent from BM (2011 to 2016).

Table 2 (a). Major crop cultivated Before NICRA project (N=50)

| Name of the Crop | No. | % | Ranking |
|------------------|-----|----|---------|
| Paddy | 35 | 70 | I |
| Jute | 30 | 60 | II |
| Chilli | 28 | 56 | III |
| Pulses | 20 | 40 | IV |
| Potato | 18 | 36 | V |
| Garlic | 15 | 30 | VI |
| Wheat | 12 | 24 | VII |
| Pointed Gourd | 8 | 16 | VIII |
| Brinjal | 7 | 14 | IX |
| Maize | 5 | 10 | X |
| Cucumber | 3 | 6 | XI |

Table 2 (b). Major crop cultivated after NICRA project (N=50)

| Name of the Crop | No. | % | Ranking |
|------------------|-----|-----|---------|
| Paddy | 50 | 100 | I |
| Potato | 45 | 90 | II |
| Jute | 40 | 80 | III |
| Chilli | 35 | 70 | IV |
| Garlic | 28 | 56 | V |
| Pointed gourd | 22 | 44 | VI |
| Brinjal | 18 | 36 | VII |
| Maize | 12 | 24 | VIII |
| Pulses | 10 | 20 | IX |
| Wheat | 9 | 18 | X |
| Cucumber | 8 | 16 | XI |

It was observed from the Table 2 (a) that before NICRA (before 2011) project at Khagribari Village majority of the respondents were cultivated Paddy crops (70%) followed by Jute (60%), Chilli (56%), Pulses (40%), Potato (36%), Garlic (30%), Wheat (24%), Pointed Gourd (16%), Brinjal (14%), Maize (10%) and Cucumber (6%). But after NICRA Project cultivation the above scenario was change. It was shown that [Table

no. 2(b)] after NICRA Project (after 2016) at Khagribari village majority of the respondents were cultivated paddy crops (100%), followed by Potato (90%), Jute (80%), Chilli (70%), Garlic (56%), Pointed gourd (44%), Brinjal (36%), Maize (24%), Pulses (20%), Wheat (18%) and Cucumber (16%).

It was found from the study that (Table 3) flood was major problem (48%) for agricultural crop damage at the study area followed by Drought (40%) and Cyclone (12%).

Table 3. Major Disaster damage agricultural crop at NICRA village (N=50)

| Major Natural Disaster | No. | % |
|------------------------|-----|----|
| Drought | 20 | 40 |
| Flood | 24 | 48 |
| Cyclone | 6 | 12 |

It was shown from the survey [Table 4(a)] that before NICRA Project 4% of the respondents' house type were Pacca followed by kacha (96%). Present study revealed that [Table 4(b)] after NICRA project 20 per cent of the respondents house types were pacca and 80 per cent of the respondents house type were Kacha.

Table 4 (a). House type of Khagribari Village before NICRA Project (N=50)

| Type of House | No. | % |
|---------------|-----|----|
| Pacca | 2 | 4 |
| Kacha | 48 | 96 |

Table 4 (b). House type of Khagribari Village after NICRA Project (N=50)

| Type of House | No. | % |
|---------------|-----|----|
| Pacca | 10 | 20 |
| Kacha | 40 | 80 |

It was shown from the survey (Table 5) that a numbers of innovative technologies were adopted by the respondents from NICRA projects. It was revealed from the table No. 5 that majority of the respondents were adopted Zero tillage technology in wheat (32%), followed by zero tillage technology in maize (28%), irrigation from pond (8%) and SRI method of paddy production (8%).

It was found from the survey that a numbers of technologies were discontinued by the respondents. It was revealed from the Table no. 8 that majority of the respondents' discontinued the technology of low cost *Azolla* Production (52%), followed by Zero tillage

technology of wheat (22%) and SRI method of Paddy production (10%).

Table 5. Adoption of Innovative technology from NICRA Project (N=50)

| Innovative technology | No. | % | Ranking |
|--|-----|----|---------|
| Zero tillage in Wheat | 16 | 32 | I |
| Zero tillage in Maize | 14 | 28 | II |
| Line sowing of Jute | 2 | 4 | V |
| Line sowing of onion and garlic | 2 | 4 | V |
| Irrigation from pond | 4 | 8 | III |
| Banana cultivation in wasteland | 1 | 2 | VI |
| Seedling production in plastic cup | 1 | 2 | VI |
| Pulse production in waste land | 1 | 2 | VI |
| Paddy production in lowland | 3 | 6 | IV |
| Vegetable production in pond side | 1 | 2 | VI |
| Paddy production through SRI method | 4 | 8 | III |
| Use of poly mulching in case of cucumber | 1 | 2 | VI |

Table 8. Discontinued of Innovative technology

| Innovative technology | No. | % | Ranking |
|-------------------------------------|-----|----|---------|
| Low cost Azolla production | 26 | 52 | I |
| Zero tillage of wheat | 11 | 22 | II |
| Paddy production through SRI method | 5 | 10 | III |
| Irrigation from Pond | 1 | 2 | V |
| Zero tillage of Maize | 3 | 6 | IV |

Table 9 reveals that there exist a positive and significant association between the religion and the adoption of Innovative agricultural technology and negative and significant association between the land type and the adoption of Innovative agricultural technology. The other variables i.e., age, land holding, education, family type and caste had no significant association with the Adoption of Innovative agricultural technology. This finding is line with the study of *Voh (1982)*

Table 9. Association between personal and socio-economic traits with Adoption of Innovative technology

| Variable | 'r' value | Remarks |
|--------------|-----------|---------|
| Age | 0.2203 | NS |
| Land Holding | 0.0991 | NS |
| Education | 0.1156 | NS |
| Family Type | 0.0100 | NS |
| Religion | 0.2362 | 5% |
| Caste | -0.13531 | NS |
| Land Type | -0.2338 | 5% |

Table 10 reveals that there exist a positive and significant association between the religion and

discontinuation of Innovative agricultural technology and negative and significant association between the caste, land type and discontinuation of Innovative agricultural technology. The other variables i.e., age, land holding, education and family type had no significant association with the Discontinuation of Innovative agricultural technology.

Table 10. Association between personal and socio-economic traits with Discontinuation of Innovative technology

| Variable | 'r' value | Remarks |
|--------------|-----------|---------|
| Age | 0.036408 | NS |
| Land Holding | -0.1105 | NS |
| Education | 0.152719 | NS |
| Family Type | -0.11144 | NS |
| Religion | 0.242321 | 5% |
| Caste | -0.23562 | 5% |
| Land Type | -0.34594 | 1% |

CONCLUSION

It can be concluded from the investigation that majority of the respondent were primary school pass followed by secondary school pass. They were more involved in farming activity. It was found from the study that majority of the respondents land holding size were larger than others. It was shown that majority of the respondents were middle age group (more than 35 years to less than 50 years). This category age group was more involved in agriculture activity. It was found that majority of the respondents religions were Hindu than Muslim. So policy may be taken in a proper way which is not harmful on religion. It was shown that majority of the respondent family type was joint followed by nuclear. This category respondent may get more time to take new agricultural technology and attachment with different extension organisation. This finding is in line with the results reported by *Oluoch-Kosura et al. (2002)*. It was shown from the investigation that majority of the respondents land type was midland followed by upland and low land. So scientist may apply the new agricultural technology accordingly. It was interesting from the finding that all the respondents were male farmer and their major occupation were farming and 72 per cent of the respondents holding more than 2 acre of land. The impact of NICRA was visible through the migration and annual income data where it was clearly shown that 90 per cent migration were reduced and farmers' income increases upto 66.66 per cent from

BM after implementation of NICRA project at Khagribari Village. Paddy, Potato, jute, Chilli and Pulses are major crops cultivated at NICRA village. Zero tillage technology of Wheat and Maize were more adopted by the respondents than others agricultural technology and low cost of *Azolla* production and Zero tillage technology of wheat were more discontinued by the respondents. So policy may take for reducing the discontinuation of agricultural technology by the farmers. It was clear from the study that there was a positive and significant association between the religion and the adoption of Innovative agricultural technology and negative and

significant association between the land type and the adoption of Innovative agricultural technology and there was a positive and significant association between the religion and discontinuation of Innovative agricultural technology and negative and significant association between the caste, land type and discontinuation of Innovative agricultural technology. Hence it is assumed that the findings of this study will be able to provide an important guideline for policy makers, Scientist, government and non-government organisation in case of application of any innovative agricultural technologies and their evaluation.

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