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RESEARCH ARTICLE

DISCONTINUANCE OF AGRICULTURAL INNOVATIONS BY FARMERS IN THE TARAI REGION OF UTTARAKHAND

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ABSTRACT

India is predominantly a nation of small farms. Small and marginal farmers are the main providers of food and nutritional security to the nation and face a number of challenges. To meet these challenges, the sector needs to use knowledge more intensively and put innovations to use in the shortest possible time. Innovations play an important role in increasing food production and optimizing resource utilization by farmers. Despite herculean extension efforts, there is still a wide gap between agricultural technologies developed at research institutions and their adoption by farmers. Often, innovations are rejected by the farmers after initial adoption due to several reasons. Hence, this study was undertaken to find out the extent of discontinuance of agricultural innovations. The study was carried out in U.S. Nagar district of Uttarakhand. Five agricultural innovations viz. direct seeding of rice, application of bioagents, mushroom cultivation, polyhouse cultivation and nutritional gardening were selected for the study. For data collection, 89 farmers were interviewed by the researcher using a pretested schedule. The findings revealed that direct seeding of rice had highest discontinuance, followed by the application of bioagents, mushroom cultivation and polyhouse cultivation. Nutritional gardening was not discontinued by anyone.

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INTRODUCTION

Agriculture sector continues to be the backbone of Indian economy and play a key role in the socio-economic development of the nation. Small farms, though operating only on 44 per cent of land under cultivation, are the main providers of food and nutritional security to the nation. On the other hand, Indian farmers working under small farms conditions face difficulties in terms of limited access to technology, inputs, credit, capital and markets. One of the serious challenges facing agriculture sector today is the need to produce more food for a growing population with limited land and water resources which heightens the critical role of innovations in making Indian agriculture more competitive and sustainable. There is a broad consensus that innovations are critical for meeting the challenges that confront the human race, including the need to improve competitiveness, sustainability and equity in agriculture. Innovations not only play an important role in food production but also have a potential to optimize resource management and utilization by the farmers.

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Rogers (2003) defined an innovation as "an idea, practice or object that is perceived as new by an individual or unit of adoption". Irrespective of time when the idea or practice was originally developed, it may be considered as an innovation when a person first becomes aware of its existence. Using something old in a new way or applying something new to successfully produce desired change/outcome can also be termed as an innovation. Thus, "perceived newness" is the critical feature of any innovation. A number of facts determine whether an innovation will be adopted (the decision to make full use of the innovation) or rejected (the decision not to use the innovation) by the unit of adoption. However, besides these two decisions, the unit of adoption may decide to reject an innovation after using it for some time, which is known as discontinuance.

Once the innovation is adopted, the adopter usually continues to use it till a better alternative is available. But, at times, the adopter may stop using it even when a better alternative is not available. Discontinuance refers to the decision of the adopter to discard the innovation after bringing it to full use. Over a period of time, the real extent of adoption of innovation is indicated by the number of adopters who are still using it at that particular point of time and not the initial number of adopters who had started using the particular innovation. To

find out the real adoption level, one has to consider the number of discontinued users as well and subtract their number from that of initial adopters. Once an innovation is developed at a research institute or a State Agricultural University (SAU), it is delivered to the farmers through KVKs and other extension agencies. Despite herculean efforts, there is still a wide gap between agricultural innovations developed at research institutions and their adoption by small-scale farmers and rural households (Kroma, 2003). Researchers predominantly focus on the successful innovations. But the concern should also be about the unsuccessful ones as they were also developed by keeping in mind a specific need or problem and were developed by investing a lot of effort and resources, just like the successful ones. Saxena (1994) in a study on *Eucalyptus* plantation in Uttar Pradesh found that the practice was subsequently discontinued by all the adopters after its large-scale adoption by farmers during 1980-86. Singh *et al.* (2010) in a study on vocational trainings conducted by KVKs in Punjab found that 20% and 53% of the beekeeping and mushroom cultivation adopters respectively had discontinued the enterprises over time.

Studies outside India also indicate that discontinuance of innovations is a common phenomenon. Bishop and Coughenour (1964) in a study on discontinuance of farm innovations in Ohio State revealed that 13% farmers discontinued the recommended farm innovations at a later stage. Miller and Mariola (2008) indicated that there was a high rate of discontinuance of all the conservation farm technologies in the Parismina watershed of Costa Rica. Thus, finding out the extent to which innovations are discontinued by adopters and the reasons behind their failure is essential for generation of better innovations and more successful efforts to diffuse them within the social system. Hence, this study was conducted to assess the extent of discontinuance of selected agricultural innovations in the study area.

MATERIALS AND METHODS

The study was conducted in Udham Singh Nagar district of Uttarakhand state. Udham Singh Nagar was selected purposively for the study because farmers in the district are well known throughout the country for their progressiveness and have shown a great prosperity towards use of improved seeds, fertilizers and agricultural technologies on a large scale. Agricultural innovations were listed. Five innovations that were promoted and disseminated to farmers by scientists of the College of Agriculture, G.B. Pant University of Agriculture & Technology and Department of Agriculture in the last ten years, viz. direct seeding of rice, application of bioagents, mushroom cultivation, polyhouse cultivation and nutritional gardening were selected randomly for the study using chit method. The initial list of adopters of these innovations from four blocks in the district comprised of 138 respondents. Out of these, only 89 respondents could be traced by the researcher and all of them were selected for the study.

Extent of discontinuance was measured by the following formula:

Extent of discontinuance

$$= \frac{\text{No. of farmers who discontinued the innovation}}{\text{Total no. of farmers who initially adopted the innovation}} \times 100$$

RESULTS AND DISCUSSION

Characteristics of the farmers: The findings revealed that most of the respondents were middle-aged (44.90%), males (84.3%), belonging to general caste (61.8%) and were educated up to graduation level (32.6%). Most of the respondents had small-sized families (78.7%), farming was the primary occupation of majority of the respondents (73%) and 36.36% had business as the secondary occupation. It was found that 46.1% respondents owned marginal-sized holdings. Majority of the respondents (97.8%) belonged to Above Poverty Line (APL) category, had low level of social participation (81%), medium level of information seeking behavior (46.1%) and neutral attitude towards the research station (65.17%). Study also revealed that maximum number of respondents had medium level of economic motivation (49.4%), high innovativeness (59.6%) and medium level of risk taking ability (61.8%). A brief account of socio-economic, communication and psychological characteristics of farmers in the study area is given below in Table 1.

Extent of discontinuance of agricultural innovations

Extent of discontinuance is measured as percentage of respondents who had stopped using the innovation over the total number of respondents who initially adopted it. It was measured for all the five innovations which were selected for the study. The innovation-wise extent of discontinuance is given as follows:

Direct seeding of rice

Out of the total 89 respondents selected for the study, 16 respondents had adopted direct seeding of rice. All of them had discontinued it, giving 100% discontinuance. Non-availability of weedicides was found to be the major reason for the discontinuance of this innovative practice. Interestingly, some farmers who discontinued it were found to be willing to re-adopt this innovation in the near future.

Bioagents

Out of the total 89 respondents selected for the study, 12 had initially adopted bio-agents in their fields. Out of them, it was found that ten respondents had discontinued the use of bioagents. Thus, the extent of discontinuance for the bio-agents was found to be 83.3%. Lack of extension agency contact/support and lack of interest of the farmers to further use the bioagents were found to be the major reasons for their discontinuance.

Mushroom cultivation

Out of the total 89 respondents selected for the study, 10 respondents had started growing mushroom after the training. Out of them, five respondents were found to have discontinued mushroom cultivation, resulting in its 50% discontinuance. Respondents' engagement in other activities and non-availability of good quality spawn led to the discontinuance of mushroom cultivation.

Polyhouse cultivation

It was found that initially, 21 respondents had adopted polyhouse cultivation. Out of these, four polyhouse cultivators

had discontinued the innovation at the time of the study. Thus, the extent of discontinuance of polyhouse cultivation was 19.04%.

Table 1. Distribution of respondents on the basis of socio-economic, communication and psychological characteristics

| Characteristics | Frequency | Percentage |
|-----------------------------------|-----------|------------|
| Age | | |
| Young (21-38 yrs) | 35 | 39.4% |
| Middle (39-56 yrs) | 40 | 44.9% |
| Old (57-74 yrs) | 14 | 15.7% |
| Gender | | |
| Women | 14 | 15.7% |
| Men | 75 | 84.3% |
| Caste | | |
| General | 55 | 61.8% |
| OBC | 13 | 23.6% |
| SC/ST | 21 | 14.6% |
| Education | | |
| Illiterate | 3 | 3.4% |
| Can read & write only | 1 | 1.1% |
| Primary education | 11 | 12.4% |
| Secondary education | 11 | 12.4% |
| Higher secondary education | 14 | 15.7% |
| Diploma | 1 | 1.1% |
| Graduation | 29 | 32.6% |
| Post Graduation & above | 19 | 21.3% |
| Family size | | |
| Small (2-6) | 70 | 78.7% |
| Medium (7-11) | 17 | 19.1% |
| Large (>12) | 2 | 2.2% |
| Primary Occupation | | |
| Business | 1 | 1.1% |
| Independent profession | 3 | 3.4% |
| Cultivation | 65 | 73% |
| Service | 7 | 7.9% |
| Student | 3 | 3.4% |
| No work | 10 | 11.2% |
| Secondary Occupation | | |
| Labour | 9 | 27.27% |
| Business | 12 | 36.36% |
| Independent profession | 1 | 3.03% |
| Cultivation | 2 | 6.06% |
| Service | 9 | 27.27% |
| Size of the landholding | | |
| Marginal (<1 ha) | 41 | 46.1% |
| Small (1-2 ha) | 12 | 13.5% |
| Semi-medium (2-4 ha) | 13 | 14.6% |
| Medium (4-10 ha) | 18 | 20.2% |
| Large (>10 ha) | 5 | 5.6% |
| Family income | | |
| APL category | 87 | 97.8% |
| BPL category | 2 | 2.2% |
| Social participation | | |
| Low | 81 | 91% |
| Medium | 7 | 7.9% |
| High | 1 | 1.1% |
| Information seeking behavior | | |
| Low | 39 | 43.8% |
| Medium | 41 | 46.1% |
| High | 9 | 10.1% |
| Attitude towards Research Station | | |
| Favourable | 24 | 26.97% |
| Neutral | 58 | 65.17% |
| Unfavourable | 7 | 7.86% |
| Economic motivation | | |
| Low | 7 | 7.9% |
| Medium | 44 | 49.4% |
| High | 38 | 42.7% |
| Innovativeness | | |
| Low | 9 | 10.1% |
| Medium | 27 | 30.3% |
| High | 53 | 59.6% |
| Risk taking ability | | |
| Low | 24 | 27% |
| Medium | 55 | 61.8% |
| High | 10 | 11.2% |

Table 2. Innovation-wise extent of discontinuance

| S. No. | Innovation | Extent of discontinuance (%) |
|--------|------------------------|------------------------------|
| 1 | Direct seeding of Rice | 100 |
| 2 | Bioagents | 83.3 |
| 3 | Mushroom cultivation | 50 |
| 4 | Polyhouse cultivation | 19.04 |
| 5 | Nutritional gardening | 00 |
| | Overall | 46.05 |

Lack of funds to reconstruct the accidently-destroyed polyhouses was found to be the major reason for the discontinuance of polyhouse cultivation.

Nutritional gardening

In case of nutritional gardening, 19 respondents had adopted the practice. Interestingly, none of them had discontinued it, giving 0% discontinuance.

Overall extent of discontinuance

Overall discontinuance for all the five agricultural innovations selected for the study was found to be 46.05%. Non-availability of labour for farm operations, unsuitable sowing-time in case of direct seeding of rice and huge crop losses in case of polyhouse cultivation due to severe pest infestation were the unanticipated reasons for discontinuance of the innovations respectively.

Conclusion

The present study revealed that out of five selected agricultural innovations, direct seeding of rice was discontinued by maximum number of respondents (100%). The extent of discontinuance of bioagents was 83.3% followed by mushroom cultivation (50%). The extent of discontinuance of polyhouse cultivation was found to be 19.04%. The reasons behind its discontinuance were unexpected which included destruction of polyhouse structure due to natural calamities (thunderstorms), and other unfortunate accidents like burning of whole structure due to fire. Nutritional gardening was least discontinued with zero percent discontinuance. In order to prevent the higher extent of discontinuance of useful agricultural innovations, the role of extension agencies should extend beyond mere information giving in present day context and should include providing inputs or linking the clients with input agencies. In case of innovations that are market oriented, the agencies should examine the market before promoting the innovation. They may also suggest possible buyers to the adopters.

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