



Perception of Fellow Farmers on Lead user Developed Innovations in Agriculture

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ABSTRACT

Background: A lead user can be defined as a person who faces a need before the rest of the population. They are far ahead of the market trend and hence, satisfy their need by developing innovations. In a particular small social system, farmers also generate innovations that are well ahead of other technologies. These farmers are often termed as lead users. The defining feature of these innovations is that they are made of locally available resources and farmers' knowledge and wisdom. Farmers often rely on the experiences and opinions of their peers while considering new practices or technologies. Fellow farmers serve as key nodes in this diffusion process, influencing the spread of innovation through word-of-mouth communication, informal networks and social interactions.

Methods: Uttar Pradesh (UP) has been taken as the universe for the study because of rich agricultural scenario of state. Thirteen districts were selected purposively for the study, based on districts having maximum number of lead users. Descriptive research design was used for the study. For every innovation developed by a lead user, ten fellow farmers were selected purposively. Those fellow farmers were selected who were either using the innovation developed by the lead user or were aware about it.

Result: From the study it was found that JP-151 variety, low-cost sugarcane rotavator cum water pumping set, adverse climatic crop cultivation, AGM combine harvester, Improved fodder cutter, portable biogas plant, network of farmers and scythe were considered highly effective by the fellow farmers.

Key words: Effectiveness, Fellow farmers, Lead user, Perception.

INTRODUCTION

Agriculture sector is full of technologies and innovations. Earlier, generating innovations and disseminating them was mainly limited to researchers but now with the passage of time, innovations are being developed by farmers as well. In a particular small social system, farmers also generate innovations that are well ahead of other technologies. These farmers are often termed as lead users.

A lead user can be defined as a person who faces a need before the rest of the population. They are far ahead of the market trend and hence, satisfy their need by developing innovations (Hippel, 1988).

The defining feature of these innovations is that they are made of locally available resources and farmers' knowledge and wisdom. The cost of these innovations is low and requires less input in comparison to centralized innovations. Hence a farmer is a lead user in agriculture who develops innovations and uses it before the rest of the population, while the other farmers wait for the innovations to happen.

Social networks have always been an important influence on farmer learning and decision-making (Rogers and Kincaid, 1981). Adoption and diffusion studies in agriculture have consistently shown that one of farmers' most commonly cited sources of information and ideas is other farmers (Oreszczyn *et al.*, 2010, Rogers, 2003). Peer-to-peer learning is often more relatable and practical than information from external sources.

By actively engaging in research activities, fellow farmers contribute to the generation of practical knowledge and help refine innovations to suit local conditions and needs. Farmers often rely on the experiences and opinions of their peers when considering new practices or technologies.

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Positive perceptions from fellow farmers serve as social proof, indicating that an innovation is credible. By sharing their insights and lessons learned, fellow farmers contribute to a culture of peer learning and exchange, facilitating the diffusion of innovation. Farmers trust innovations more when they see them successfully implemented by their peers in similar conditions. The perception of fellow farmers regarding the risks and potential benefits of innovation can influence individual farmers' risk perception.

MATERIALS AND METHODS

Uttar Pradesh (UP) has been taken as the universe for the study because of rich agricultural scenario of state. Thirteen

districts were selected purposively for the study based on districts having maximum number of lead users as shown in Table 1. Descriptive research design was used for the study. For every innovation developed by a lead user, ten fellow farmers were selected purposively. Those fellow farmers were selected who were either using the innovation developed by the lead user or were aware about it.

In order to find out the perception of fellow farmers regarding effectiveness of lead user developed innovations in agriculture, 30 statements were framed after due consultation with experts and by exhaustive review of literature.

In order to test the relevancy, a Google form containing 30 statements was sent to 143 experts in the field of extension at different SAUs, KVKs and state departments. Out of these 38 people responded. Statements regarding perception of fellow farmers on the effectiveness of innovations developed by lead users were rated by the experts on a three-point continuum corresponding to most relevant, relevant and non-relevant. Responses obtained were analysed and relevancy scores were calculated.

a) Relevancy percentage (RP)

It is the number of respondents who scored the given statement as 'most relevant' and 'relevant', which is converted into percentage.

$$RP = \frac{FS}{\text{No. of respondents}} \times 100$$

Where,

FS= Frequency score of most relevant and relevant.

b) Mean relevancy weightage (MRW)

It is the ratio of actual score obtained to maximum possible score (MPS) for each statement. It was calculated by using the following formula.

$$MRW = \frac{MRRX3 + RRX2 + LRRX1}{MPS}$$

Where,

MRR= Most relevant response.

RR= Relevant response.

LRR= Least relevant response.

MPS= Maximum possible scores [No. of Judges*3].

c) Mean relevancy score (MRS)

It is the ratio of actual score obtained to the number of judges who responded for the variable.

$$MRS = \frac{MRRX3 + RRX2 + LRRX1}{\text{No. of judges}}$$

Where,

MRR = Most relevant response.

RR = Relevant response.

LRR = Least relevant response.

Using these criteria the statements were screened for inclusion in final interview schedule. Those statements

were selected and included in interview schedule which were having relevancy percentage >70, mean relevancy weightage >0.70 and mean relevancy score > 2. Thus, out of 30 statements 21 statements were included in the final interview schedule.

RESULTS AND DISCUSSION

Data regarding perception of fellow farmers towards exotic vegetable cultivation and AGM combine harvester is presented in the Table 2. It can be inferred from the table that majority of fellow farmers (70%) perceived exotic vegetable cultivation to be less effective. There were several reasons associated with this perception including lack of technical guidance regarding cultivation of exotic vegetables, lack of market as well as satisfied with the practices they were following at present. Contradictory findings were reported by Reddy *et al.* (2023) in a study on a scale to analyse the perception of vegetable and flower growers towards protected cultivation. The results revealed that a vast majority of the vegetable and flower growers (80.56%) had good to better perception towards protected cultivation. For AGM combine harvester, it can be inferred from the data that majority of fellow farmers (60%) perceived AGM combine harvester to be effective as it gave good results in the field, easy to use and was easily available on rent.

Data regarding perception of fellow farmers towards mobile sprinkler irrigation system and improved fodder cutter have been presented in the Table 2. It can be inferred from the data that half of the fellow farmers (50%) perceived this innovation to be effective. Fellow farmers reported that the sprinkler system consumed less water and is suitable for small area. Farmers also said that the technology was suitable for a variety of crops like sugarcane, peas, wheat, potato *etc.* which explains their high level of satisfaction. Contradictory findings were reported by Karthikeyan and Naidu (2017) in a study on perception of farmers about maintenance of drip irrigation system in Tamil Nadu. It was

Table 1: Distribution of lead users.

Districts	Number of lead users
Lakhimpur	4
Gorakhpur	4
Kausambhi	3
Kanpur	3
Basti	3
Varanasi	3
Bareilly	2
Lucknow	2
Gonda	2
Santkabeer Nagar	1
Barabanki	1
Allahabad	1
Deoria	1
Total	30

reported that one of the constraints for adoption was the insufficient knowledge about pressure regulation in the drip irrigation system. For improved fodder cutter it can be inferred from the data that half of fellow farmers (50%) perceived improved fodder cutter to be highly effective as it was made of locally available material and was affordable. Contradictory findings were reported by Salokhe (2019) in a study on responsible agricultural inputs marketing: a key to save environment. It was concluded from the study that the agricultural revolution is possible only by use of modern agricultural inputs. It was stated that agro- input companies should be innovative and they have to produce very effective, safe and cheap agro-inputs.

Data regarding perception of fellow farmers towards portable biogas plant with purification system and Karan Vandana have been presented in the Table 2. Majority of the fellow farmers felt that the biogas plant was effective as it saves money on LPG cylinder. Further, decayed waste for the tank can be used as organic manure and through

this process waste recycling can be done. Overall fellow farmers appreciated this innovation and wanted it to be made available on large scale. Contradictory findings were reported by Wamboka (2015) in a study on analysis of biogas technology adoption among households in kilifi county. The findings from the study revealed that, the significant determinants of biogas adoption among households were: household income, household head's highest level of education and the unavailability of technical services. The underlying causes to the three areas of significant were: poverty at household level, low level of education and early marriages among women who are the main implementers of the technology. For Karan Vandana variety majority of fellow farmers (60%) perceived high yield of Karan Vandana variety to be effective. It was found that the farmers perceived the innovation to be effective as it gave higher yield with minimum inputs.

Data regarding perception of fellow farmers towards Kabir Combine Harvester and adverse climatic crop

Table 2: Perception of fellow farmers regarding lead user developed innovations.

Innovation	Perception of fellow farmers (%)		
	Highly effective	Effective	Less effective
Marketing of exotic vegetables	10	20	70
AGM combine harvester	60	20	20
Mobile sprinkler irrigation system	30	50	20
Improved fodder cutter	50	30	20
Portable biogas plant with purification system	50	40	10
High yield of karan vandana variety of wheat	30	60	10
Kabir combine harvester	40	30	30
Adverse climatic crops cultivation	60	10	30
Innovative technique of using clay pellets of sowing paddy	40	50	10
Bicycle operated foot pump	40	10	50
Captain basti combine harvester	0	50	50
In-plant germination of sugarcane	30	30	40
Low-cost production of sugarcane	50	0	50
Modified tractor	20	40	40
Vertical bud plantation	50	30	20
Multiple varieties of mango in a single tree	20	60	20
Marigold oil extraction	20	50	30
Lost cost sugarcane rotavator cum water pumping set	70	10	20
Gudel yantra	0	30	70
Large scale vermicomposting	50	40	10
Income generating farming	40	20	40
Network of farmers	50	30	20
Strawberry cultivation	40	30	30
Modified trench opener	40	50	10
Scythe	50	20	30
Godson organic farm	10	40	50
Bio-fertilizer	10	30	60
Kudrat- 9 (Variety)	40	30	30
JP-151 (Variety)	60	10	30
Baba vishwanath (variety)	50	40	10

cultivation have been presented in the Table 2. It can be concluded from the data that maximum number of fellow farmers (40%) perceived innovation to be highly effective. It was found that farmers perceived combine harvester highly effective because it performed well during harvesting. Similar findings reported by De Toro and Hansson (2004) in a study on Machinery co-operatives-a case study in Sweden. The findings reported that the farmers had satisfaction with the performance of combine harvester operators with more than three years of experience while a study on the status of farm mechanization in India revealed that the farmers had satisfaction with the timely operations of tractors which provided them a better control system (Verma,2006).For adverse climatic crop cultivation, it was found that majority (60%) of fellow farmers felt that this innovation was effective because it was profitable.

Data regarding perception of fellow farmers towards use of clay pellets for sowing paddy and bicycle operated foot pump have been presented in the Table 2. It can be concluded from the data that majority of fellow farmers (50%) perceived innovation to be effective. It was found that the innovation was considered effective by fellow farmers as it saves time and water as paddy seeds germinate inside the pellets thus reducing the time and water requirement. It can be concluded from the data that half of the fellow farmers (50%) perceived this innovation to be less effective. For bicycle operated foot pump, it was revealed during the discussion with fellow farmers that it requires high manual labour and takes a long time. Farmers felt that the pump should be modified to save the time and labour.

Data regarding perception of fellow farmers towards Captain Basti Combine Harvester and in-plant germination of sugarcane have been presented in the Table 2. It can be concluded from the data that half of the fellow farmers (50%) perceived innovation to be effective while other half considered it less effective (50%). Fellow farmers perceived combine harvester as effective because it performed well during harvesting as well as easily available on rent. Farmers said it less effective because they were not allowed to operate it rather lead user operated it in their field. It can be concluded from the data that maximum fellow farmers (40%) perceived in-plant germination to be effective as it helps in production of in-plant setts (seeds). This had minimized the use of extra setts and also it in reduction of cost. Similar findings were reported by Lavanya and Manjunathai (2019) in a study on determinants of micro-level decisions of sugarcane farmers found that in the sample area, sugarcane has been the major crop for a very long period and when farmers were asked to name the top five determinants that influenced them for choosing sugarcane, they stated that water requirement (98%), land availability (97%), method of cultivation (83%), market availability (70%), risk involved (51%) and profitability (50%) were some of the major determinants.

Data regarding perception of fellow farmers towards low-cost production of sugarcane and modified tractor have

been presented in the Table 2. It can be concluded from the data that half of fellow farmers (50%) perceived innovation to be highly effective while another half (50%) considered it to be less effective. It was found that the farmers found this innovation effective as it involved judicious use of resources besides higher yield. Other half considered it less effective because of lack of market. Similar findings were reported by Nazir *et al* (2013) in a study on factors affecting sugarcane production in Pakistan. Data were collected from 387 sugarcane growers from Sindh, Punjab and NWFP province. The study revealed that the costs of inputs of sugarcane *i.e.* urea, DAP, FYM, land preparation, seed and its application, weeding and cost of irrigation were the important factors which influenced on the returns of sugarcane growers. For modified tractor, it can be concluded from the data that maximum number of fellow farmers (40%) perceived the innovation to be effective. It was found during discussion with fellow farmers that modified tractor is effective because it also serves the dual purpose of the tractor which not only provides electricity but is also useful in farming and helps in transporting the harvest in an easy way.

Data regarding perception of fellow farmers towards marigold oil extraction and low-cost sugarcane rotavator have been presented in the Table 2. It can be concluded from the table that majority of the fellow farmers (60%) perceived marigold oil extraction to be effective as it has helped in propagating their nursery business. Innovation was found to be effective as it provided extra income. Further, this technique utilized the whole marigold plant and there was little wastage. For low-cost sugarcane rotavator, it can be concluded from the data that majority of fellow farmers (70%) perceived innovation to be highly effective because the lead user is using the same engine for running two machines (water pumping set and sugarcane rotavator) and all materials used for making this machine are easily available.

Data regarding perception of fellow farmers towards Gudel Yantra and large-scale vermicomposting have been presented in the Table 2. It can be concluded from the data that majority of fellow farmers (70%) perceived the innovation to be less effective followed by effective (30%). Fellow farmers perceived this innovation to be less effective due to high cost and it was not useful against all the animals that destroy the crops. For large scale vermicomposting, it can be concluded from the data that half of the fellow farmers (50%) perceived this innovation to be highly effective followed by effective (40%) and less effective (10%).Fellow farmers were of the opinion that this innovation is effective as it is profitable when suitable market is available. Contradictory findings were reported by Mainoo *et al* (2008) in a study on vermicompost as a fertilizer for urban and peri-urban farms: perceptions of farmers in Accra, Ghana. It was reported that farmers involved in irrigated vegetable farming had insufficient space and time for on-farm vermicomposting, while

subsistence farmers lacked a reliable access to water necessary for on-farm vermicomposting; but both types of farmers were interested in adopting vermicompost if it improved crop performance. Similar findings were reported by Amareswari (2014) in a study on jeevamrutha as an alternative of chemical fertilizers in rice production. It was reported in study that the benefit-cost ratio of Masura rice production through chemical farming was 3.0 whereas it was 3.39 with Jeevamrutha, an increase of 13% over chemical farming. The benefit-cost ratio of Hamsa rice production through chemical farming was 0.6, whereas the same with Jeevamrutha was 1.09, indicating an increase of 81% in Jeevamrutha method over chemical farming. Contradictory findings were reported by Suman *et al.* (2017) in a study on farmers' perception constraints for lesser adoption of fodder production technologies and ways to improve the adoption in Bundelkhand region. It was reported from the study that the main reason for less knowledge of fodder production technologies was lack of awareness about improved technologies (76.8%) followed by the reason of lack of on-farm guidance/training (69.8%) of the people, lack of lesser resources (62.0%) and lesser literacy (56.3%) respectively.

Data regarding perception of fellow farmers towards income-generating farming and network of farmers have been presented in Table 2. It can be concluded from the data that 40 percent of the farmers perceived innovation to be highly effective as it is profitable. Many farmers also considered it less effective because experimentation required land and they did not have that much land. For network of farmers, it can be concluded from the data that half of the fellow farmers (50%) perceived innovation to be highly effective. Farmers considered the innovation to be effective because the lead user had linked several farmers of his village to Mother Dairy and uplifted their condition by bringing price/quality concept.

Data regarding perception of fellow farmers towards strawberry cultivation and modified trench opener have been presented in the Table 2. It can be concluded from the data that 40 per cent of perceived innovation to be highly effective. Fellow farmers felt that the innovation was effective as strawberry cultivation was highly profitable. However, no farmer of that village had adopted it because of high initial cost as well as risk of failure. For modified trench opener, it can be concluded from the data that half of the fellow farmers (50%) perceived the innovation to be effective. Fellow farmers perceived the modified trench opener to be effective because it works smoothly in the field.

Data regarding perception of fellow farmers towards scythe and Godson organic farm have been presented in the Table 2. It can be concluded from the data that half of the fellow farmers (50%) perceived scythe to be highly effective. This is due to the fact that scythe was easy to handle and the cost was low. The tool functions efficiently in the field situation and can be used by small and marginal farmers. It can be concluded from the data that half of the

fellow farmers (50%) perceived the Godson organic farm to be less effective. Fellow farmers perceived the innovation to be less effective as it gives delayed results as well as yield is less during initial years. Apart from this, creating a good marketing network is also a tough task according to fellow farmers.

Data regarding perception of fellow farmers towards biofertilizer and Kudrat-9 have been presented in the Table 2. It can be concluded from the data that majority of the fellow farmers (60%) perceived biofertilizer to be less effective. Farmers felt that yield obtained is also low and they are satisfied with the use of chemical fertilizers. For Kudrat-9 variety of wheat, it can be concluded from the data that 40 percent of fellow farmers perceived it as highly effective. It was found that fellow farmers considered this variety to be effective because it gives high yield and number of grains/spikes was also more. This variety does not have lodging problem as well. Farmers have planted this variety in their field and were satisfied with the performance of this variety.

Data regarding perception of fellow farmers towards JP-151 and Baba Vishwanath variety have been presented in the Table 2. It can be concluded from the data that majority of the fellow farmers (60%) perceived the innovation to be highly effective. Majority of the fellow farmers perceived JP-151 variety to be effective in terms of field performance. It was reported that lower yield was obtained when it was inter-cropped with other crops. For Baba Vishwanath variety, it can be concluded from the data that half of the fellow farmers (50%) perceived the innovation to be highly effective. Farmers reported that the performance of Baba Vishwanath variety was good as it gives less yield only when sowing is done late.

CONCLUSION

From the study it was found that JP-151 variety, low-cost sugarcane rotavator cum water pumping set, adverse climatic crop cultivation, AGM combine harvester, Improved fodder cutter, portable biogas plant, network of farmers and scythe were considered highly effective by the fellow farmers. Farmers were likely to perceive innovations more positively if they saw them as offering significant advantages over existing practices. This might include increased yields, reduced costs, improved efficiency, or environmental sustainability. In conclusion, farmers' perception of innovations is shaped by their assessment of relative advantage, compatibility, complexity, observability and trialability.

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Disclaimers

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Conflict of interest

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