



A study on institutionalization of farmer-led innovations for their scaling up

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ABSTRACT

The present study was undertaken during 2015-16 in order to identify the extent of involvement, prioritization of institutions involved in scaling up of farmer-led innovations and also the challenges faced by the officials in institutionalization. A sample size of total 50 respondents involved in promoting farmer-led innovations, located at different places of northern India, were selected through purposive sampling. Friedman's test statistics results revealed that the degree of involvement of the institutions was found higher for documentation (mean rank 3.93) followed by dissemination (mean rank 2.26). Further the present study results showed the prioritization of institutes/organizations for different activities of scaling up. It has been inferred that district level institutions for documentation, research institutions for performing validation, private agencies for commercialization and state agricultural universities for dissemination of innovations. The study also highlighted the major constraints for officials in scaling up of innovations.

Key words: Constraints, Extent of involvement, Farmer-led innovations, Scaling up

In India, a considerable share of agricultural research falls under the ICAR (Indian Council for Agricultural Research), which oversees a large number of agencies focusing on crop, livestock, fisheries, natural resources, agricultural engineering, and policy research. According to IFPRI (2013), India's public spending on agricultural R&D (Research and Development) is 7 per cent. Though the share is still much below those of competitors such as Brazil and China, the India's investment in agricultural R&D supported significant increases in agricultural production through the implementation of innovative research-based agricultural methods and technologies. Gradually the innovations from the formal agricultural research have undergone significant changes over the past decade. But on the other side, Indian farmers are not an exception to this; there are plenty of farmer-led innovations emerging from local informal research. In the process of evolution, Indian farmers consistently addressing livelihood constraints and exploring new opportunities by experimenting with unique combinations of traditional knowledge and new ideas from a variety of sources. As the farmers innovations are inexpensive, easily accessible, locally appropriate and tested in actual farm situation, they are more rapidly accepted by other farmers than the results of formal research imposed on them. Faced with the problems of financing, farmers always try low cost technologies to suit their requirements.

Although farmers' innovation has always been

happening but quite slowly and has seldom been recognized by communities itself and the scientists also. It shows, the key actors in innovation scaling up process is not working closely with each other. The significance of farmers' innovations however ranges from being useful only to the individual farmer, sometimes even limited to specific circumstances to a wider range of application that can be used by many farmers. There are many innovations in isolated pockets having wide range of implications and need to be refined by research system for scaling up of innovations. Being aware of these challenges, many government and non-government organizations are working for institutionalization of farmer-led innovations either directly or indirectly. Institutionalization is understood as "a process through which new ideas and practices are introduced, accepted and used by individuals and organizations so that these new ideas and practices become part of 'the system' (PROLINNOVA 2010). Institutionalization is the need of the hour in horizontal and vertical expansion of farmer-led innovations. At global level, PROLINNOVA (Promoting Local Innovation in Ecologically-oriented Agriculture and Natural Resource Management), an NGO initiated international network for promoting local innovation involving partners from national non-government and government institutions working on flexible funding mechanisms for farm innovators (World Bank 2005). Government funding can reach agricultural research institutions through a variety of channels. In line with growing financial resources for institutional agricultural R&D, research spending for commercializing the local farmer-led innovations has also increased to some extent. However, very few farmer-led innovations have looked

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deeply into the process of institutionalization in a particular context due to feasibility of the innovations.

In India, many institutions/organizations like Indian Council of Agricultural Research, Department of Science and Technology (DST), PPV&FRA (Protection of Plant Varieties and Farmers Rights Authority), National Research Development Corporation (NRDC), State Agricultural Universities (SAUs), Krishi Vigyan Kendras (KVK) etc., are vigorously working for documentation, validation, commercialization and scaling up of farmer-led innovations. National Innovation Foundation (NIF) with the assistance of Department of Science and Technology, Government of India has pooled a database of over 225000 technological ideas, innovations and traditional knowledge practices from over 585 districts and till date recognized 816 grass root innovators of the country (NIF 2015). To recognize the outstanding contributions of innovative farmers, ICAR gives 'Jagjivan Ram Innovative Farmer Award' in agriculture and allied sciences (ICAR 2015). To protect these farmer-led innovations at district level, one of the activities of KVK is out scaling of farm innovations through frontline demonstration to showcase the specific benefits/worth of technologies on farmers' fields (ICAR 2014).

MATERIALS AND METHODS

The study area was mostly based on the location of the institutes which are involved in promoting farmer-led innovations. For analyzing the multi stakeholders' views, first the institutions which are assisting the innovative farmers in scaling up of their innovations in some or the other way were identified related to area of research irrespective of locale of study. A total of 24 institutions recognizing and promoting innovative farmers were selected and from them 50 respondents (range from 1 to 3) were selected through purposive sampling. For holistic view, policy maker executives were also selected. The number of respondents selected from each institute was based on the strength of the institute. Further the officials handling the unit or division in scaling up of innovations were identified and interviewed. The stakeholders were from ICAR (Awards cell, Intellectual Property and Technology Management Unit, Directorate of Knowledge Management in Agriculture, Zonal Technology Management and Business Planning Development Units, Agricultural Technology Application Research Institute of zone 1. Concerned scientists from ICAR institutes like Central Institute for Research on Goats (CIRG, Mathura) and Indian Institute of Farming Systems Research (IIFSR Modipuram) were also interviewed.

Apex level organizations selected for identification of organizational support and policies for promoting farm innovations were as follows; PPVFRA (Protection of Plant Varieties and Farmer's Rights Authority), NIF (National Innovation Foundation) and TIFAC (Technology Information, Forecasting and Assessment Council) of Department of Science and Technology, NRDC (National Research Development Corporation), MSME (Micro Small and Medium Enterprises), NISTADS (National Institute of

Science, Technology and Development Studies), CARD (Center for Agriculture and Rural Development) and Crop Care Federation. As the study area is mostly confined to some states of northern India, experts from IARI (Indian Agricultural Research Institute) and also the respondents from state agricultural universities like Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut district of Uttar Pradesh and Punjab Agricultural University, Ludhiana district of Punjab were also interviewed. The officials from other agencies that play a key role in scaling up of farmer-led innovations like Rural Development and Self Employment Training Institute (Ghaziabad, Uttar Pradesh), Young Farmers Association (Patiala, Punjab), Farmers Training Centre (Bhatinda, Punjab), Punjab Agricultural Management and Extension Training Institute (Ludhiana, Punjab) were also interviewed. The district level institutions interviewed were as follows, Agricultural Technology Management Agency (Patiala, Punjab), Krishi Vigyan Kendra (Patiala, Punjab) and Agricultural Technology Information Centre (IARI, New Delhi). The total sample size of the present study was 50.

RESULTS AND DISCUSSION

Extent of involvement of institutional stakeholders

Four categories of extent of involvement of institutional stakeholders in scaling up of farmer-led innovations (documentation, validation, commercialization and dissemination) were identified to study the degree of involvement in each category. Friedman's test was carried out and the results revealed that the mean ranks under each category differed significantly.

From the Table 1, it is clear that majority of the institutions were seeking national campaigns/exhibitions (mean rank 5.15) as the platforms for documentation of farmer-led innovations as the innovations are displayed as live models and direct interaction can be possible. Survey/personal approach (mean rank 3.91) was identified as the second important activity as personal contact helps in narration of the own experiences of innovators. It also helps in identification of remote areas innovations where there is no chance for farmers to display the innovations due to lack of awareness or support. The present study results were similar to the findings of Letty *et al.* (2010) who reported that capacity-building workshops should be allowed for sharing and learning among farmers around issues of local innovation, to identify and document cases of local innovation in the areas where they work. Very few institutions are doing validation of innovations. Their degree of involvement is more for having the expertise for testing the novelty (mean rank of 3.99). Every innovation is different therefore different subject matter experts are required for testing the new idea for its uniqueness and feasibility.

In commercialization, almost all the institutions are involved in recognizing/awarding innovators (mean rank 4.20) in some or other way in their activities as recognition motivates the innovators and encourages adoption by fellow

Table 1 Extent of involvement of institutional stakeholders based on Friedman's test (N=50)

	Particulars	Mean rank	Groups
Documentation	1. Network documentation	1.61	A
	2. Involving the media	3.14	A
	3. Empowering stakeholders	3.43	A
	4. Maintaining data base	3.76	A
	5. Survey/personal approach	3.91	A
	6. National campaigns/exhibitions	5.15	A
Validation	1. Skilled manpower for infra-structure	3.27	A
	2. Design support for refinement	3.32	A B
	3. Establishing testing facilities	3.38	A B
	4. Providing IT infrastructure	3.45	A B
	5. Developing set of indicators for validation	3.59	A B
	6. Expertise for testing the novelty	3.99	A C
Commercialization	1. Maintaining separate budget	2.62	A
	2. Raising capital from innovators	2.95	A
	3. Protecting rights with patents	3.55	A B
	4. Tie up with commercializing partners	3.57	A B
	5. Assistance in linkage with organizations	4.11	A C
	6. Recognizing/awarding innovators	4.20	A C
Dissemination	1. Demonstrations and agri tourism centres	3.03	A
	2. Inviting as resource persons	3.41	A
	3. Social recognition	3.54	A
	4. Success stories in websites/social networks	3.56	A
	5. Showcasing innovations (exhibitions/seminars etc)	3.61	A
	6. Publication and distribution of success stories	3.85	A

farmers. Secondly, they are providing assistance by linkage with organizations (mean rank 4.11). It is followed by tie-up with commercializing partners (mean rank 3.57) where the institutions are identifying the partners and providing direct linkage with innovators and the benefit sharing takes place between the innovator and the assisting organization. If the benefit sharing is acceptable to the farmers, then the innovation is commercialized. All the institutions are involved in dissemination of innovations in various ways. The major means of dissemination is through publication and distribution of success stories (mean rank 3.85). When a farmer approaches with innovation to an institute or an institute itself identifies the innovation in a particular locality, the publication of the innovation as a success

Table 2 Comparison of overall extent of involvement of institutional stakeholders based on Friedman's test (N=50)

Category	Mean rank	Groups
Commercialization	1.88	A
Validation	1.93	A
Dissemination	2.26	B
Documentation	3.93	B

story is the major activity for further spread. The second means of dissemination is showcasing innovations in the exhibitions or seminars (mean rank 3.61). Every institute is involved in conducting exhibitions and melas etc as a part of their extension activities. Display of innovations provides a platform for the farmers in showcasing of innovations.

Overall extent of involvement of institutional stakeholders

Friedman's test statistics results revealed that the overall extent of involvement (Chi-Square = 96.73, df = 3, p < 0.05) under different categories was different for documentation, validation, commercialization and dissemination activities in scaling up of the farmer-led innovations. It can be depicted from the Table 2 that the degree of involvement of the institutions is higher for documentation (mean rank 3.93) followed by dissemination (mean rank 2.26), validation (mean rank 1.93) and commercialization (mean rank 1.88). This was similar to the findings of McKenzie (2011) who argued that record keeping, monitoring and planning requirements were the major role of supporting organizations, which in turn motivates the innovators. Sangeetha (2009) reported that experiences of on-farm innovation by the grass roots were not well documented, despite their obvious practical and theoretical implications. Gupta (2013) also argued that despite the huge amount spent on developmental aid, one cannot find many databases, either online or offline, of innovative solutions developed by the disadvantaged people themselves.

Prioritization of institutions

The officials were asked to prioritize the activities of scaling up the innovations for different institutes/ organizations. The data from the Table 3 clearly indicates that in documentation category, nearly two-third of the respondents opined that the district level institutions should play a major role in documenting the grass roots innovations as they are located at the district level and within reach and also most of the farmers frequently visit for technical, financial and extension support. In case of validation of innovations, nearly half of the respondents were in the view that research institutions should act as referral centres for testing the novelty of innovations. It is due to the fact that these are authenticated centres and have expertise with necessary infrastructure. The major role in commercialization of innovations should be played by private agencies (74%). It is mainly due to the fact that in the private agencies, there are less procedural formalities

Table 3 Prioritization of institutions in scaling up the innovations (N=50)

Category	Documentation (%)	Validation (%)	Commercialization (%)	Dissemination (%)
District level institutions	31(62)	1(2)	2(4)	2(4)
State agricultural universities	4(8)	8(16)	2(4)	40(80)
Research institutions	2(4)	27(54)	7(14)	2(4)
Zonal level institutes	2(4)	2(4)	1(2)	3(6)
NGOs	4(8)	3(6)	1(2)	1(2)
Private agencies	7(14)	9(18)	37(74)	2(4)

Figures in parenthesis indicate percentage

and not influenced by the decisions of the government policies. Moreover it has the provision of sufficient budget for commercialization. Fuentes *et al.* (2013) reported the similar results and suggested that private players should assist in the commercialization of farmer-led innovations. In dissemination of innovations, more than three-fourth of the respondents opined that the state agricultural universities should be the larger players for knowledge sharing and the replication of similar success stories elsewhere in similar situations for the benefit across the country.

Constraints of officials

The officials were asked to rank the preferences of constraints of four broad categories in scaling up the farmer-led innovations (technical, infrastructural, economic, and administrative). Friedman's test statistic results (Chi-Square = 124.45, df=3, $p < 0.05$) revealed that there was significant difference between the categories of constraints. The mean rank corresponding to administrative constraints (4.00) is more and therefore it was the most important constraint among the officials in scaling up of the innovations followed by infrastructural (mean rank 2.79), technical (mean rank 1.89) and economic constraints (mean rank 1.32). The category wise constraints are mentioned in Table 4.

From the Table 4, it is evident that the major among the technical constraints for officials in scaling up of the innovations are lack of separate staff to look after only farmer-led innovations (mean rank 6.79) followed by illiteracy of the innovators (mean rank 6.33). A few organizations like NIF, TIFAC etc were fully involved in scaling up of innovations but others like district level institutions were lacking separate cells to look after these grass roots innovations. Illiteracy further leads to lack of awareness on promoting organizations which were involved in providing support for their innovations. Further lack of expertise for validation (mean rank 6.91) followed by lack of design support for refinement (mean rank 6.91) were the most severe among infrastructural constraints. Validation requires subject matter specialists for checking the novelty of innovations. Whereas in case of economic

Table 4 Severity comparison of different components of constraints among officials based on Friedman's test (N=50)

	Particulars	Mean rank	Groups
Technical constraints	1. Scouting and identification problem	1.47	A
	2. Poor technical competence	1.53	A
	3. Require more complementary inputs	3.92	B
	4. Lack of extension backup	5.14	B C
	5. Lack of role clarity of stakeholders	5.28	B C
	6. Location specificity of the innovations	5.54	C D
	7. Illiteracy of the innovators	6.33	C D
	8. Lack of separate staff	6.79	D
Infrastructural constraints	1. Lack of transport and poor communication	1.65	A
	2. Lack of skilled workers	1.65	A
	3. Lack of regular training for up gradation	3.21	B
	4. Lack of group approach	5.03	C
	5. Lack of IT infrastructure	5.03	C
	6. Lack of testing facilities	5.61	C D
	7. Lack of design support for refinement	6.91	D
	8. Lack of expertise for validation	6.91	D
Economic constraints	1. Lack of subsidy	2.94	A
	2. Untimely release of funds	2.94	A
	3. Lack of timely supply of inputs	3.23	A
	4. No insurance coverage	3.36	A
	5. Lack of separate price policy of the government	3.38	A
	6. Lack of separate budget of the government	5.36	B
	7. Disagreement in sharing of benefits of innovator and organization	7.26	C
	8. Non-availability of commercializing partners	7.53	C
Administrative constraints	1. Political interference	2.59	A
	2. Job insecurity in contractual staff	3.10	A
	3. Shortage of staff and frequent transfers	3.89	A B
	4. Poor monitoring and coordination	3.98	A B
	5. No standard set of indicators for validation	4.06	A B
	6. Lack of separate cell/staff for innovations	4.66	B
	7. Work overload and involvement in non-agricultural work	6.52	C
	8. Lack of networking between organizations	7.20	C

constraints, the most severe one was non-availability of commercializing partners (mean rank 7.53) for financial support. The commercialization depends on many factors like feasibility and significant economic impact of the innovations. It is followed by disagreement in sharing of benefits of innovator and organization (mean rank 7.26). The major among the administrative constraints expressed lack of networking between organizations (mean rank 7.20). All the selected institutions were working for promotion of innovations but it was found that there is no convergence of activities between these institutions to share the resources and capital.

Conclusion

The role of institutions and the constraints hindering for scaling up of farmer-led innovations has been analyzed. It has been observed that degree of involvement of the institutions was higher for documentation and dissemination. Further the results showed the prioritization of institutes/organizations for different activities of scaling up. Administration related constraints were identified as the major constraints for officials in scaling up of farmer-led innovations. Most important administration related constraints identified were lack of networking between organizations and work overload and involvement in non-agricultural work. Major among the technical constraints for officials were lack of separate staff to look after only farmer-led innovations and illiteracy of the innovators. Further, lack of expertise for validation and lack of design support for refinement were the most severe among infrastructural constraints. Whereas in case of economic constraints, the most severe were non-availability of commercializing partners for financial support and disagreement in sharing of benefits between innovators and organizations. Institutionalizing farmer-led innovations can make agricultural development more effective and sustainable. Application of these local innovations can

lead to social and economical transformation. Realizing the significance, more attention is being given to institutionalize farmer-led innovations by some organizations. But only few innovations are provided hand-held support to some extent. It is crucial that agricultural research expenditure and capacity of research institutions should be utilized for providing support to scale up the farmer-led innovations.

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