Land to Lab approach for promoting farmers innovation: a case study – Peermade Development Society, Idukki, Kerala

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Abstract
The scientists of Peermade Development Society (PDS), an NGO based in Idukki, Kerala, India, have initiated an approach 'Land to Lab' for the participatory technology development of farmers' innovations and unique traditional knowledge practices. Documentation, development and dissemination of farmers' innovations are the major activities envisaged under this approach. Significant achievements have been made in all aspects of intervention. A large number of innovative practices, technological innovations and unique traditional practices have been identified and documented. The innovations and unique knowledge practices relevant to societal development were selected and subjected to various formal and informal validation processes and value-addition efforts before dissemination. Value-added knowledge practices and innovations are disseminated through various commercial and non-commercial sectors. The centre has developed unique replicable enterprise models for developing and disseminating local innovations and knowledge practices with the people's participation. The paper describes the 'Land to Lab' approach, achievements and experiences, lessons learnt and major constraints.

Keywords: Farmer innovation, documentation, development, dissemination, women self-help groups

Introduction

Farmers' abilities and capabilities in developing location-specific innovations and agricultural practices for maximizing their local limited resources are not to be overemphasized. They are also using traditional knowledge judiciously for their agricultural needs and to solve their day-to-day problems in the farm sector. Unfortunately, the capabilities, capacities, and creative potentialities of farmers have been largely unrecognized, underestimated and underutilized by the formal sector.

In this context, the core scientists of Peermade Development Society (PDS), an NGO based in Kerala, India, envisaged an approach **'**Land to Lab Programme' for bridging the gap between formal and informal research Documentation, validation, value addition, Intellectual Property Rights (IPR) protection and dissemination of local innovations and unique traditional knowledge practices are the activities envisaged in the 'Land to Lab' programme.

'Land to Lab' approach

Idukki is considered as one of the most backward districts of Kerala both educationally and industrially. Marginal farmers, tribal groups and plantation labourers constitute the majority of the population. This is the second most tribal populated district and most of the villages are located in remote forest areas. Half of the area is covered by forest reserves.

PDS is an NGO working in the hilly district of Idukki in Kerala. Natural resource management, rural technology and health promotion are the areas of concern. PDS has a specific research programme supported by the Department of Science & Technology, Government of India, for developing and transferring suitable technology for the rural poor. During the implementation of the programme, we did intensive field work in rural areas to identify the rural problems. In this process, we visited several villages and discussed with the farmers to understand their problems. While visiting the villages and farmers, we realized that farmers are also developing own innovations and judiciously utilizing the traditional knowledge for maximizing their resources. We documented several innovations and low-cost technologies from the rural

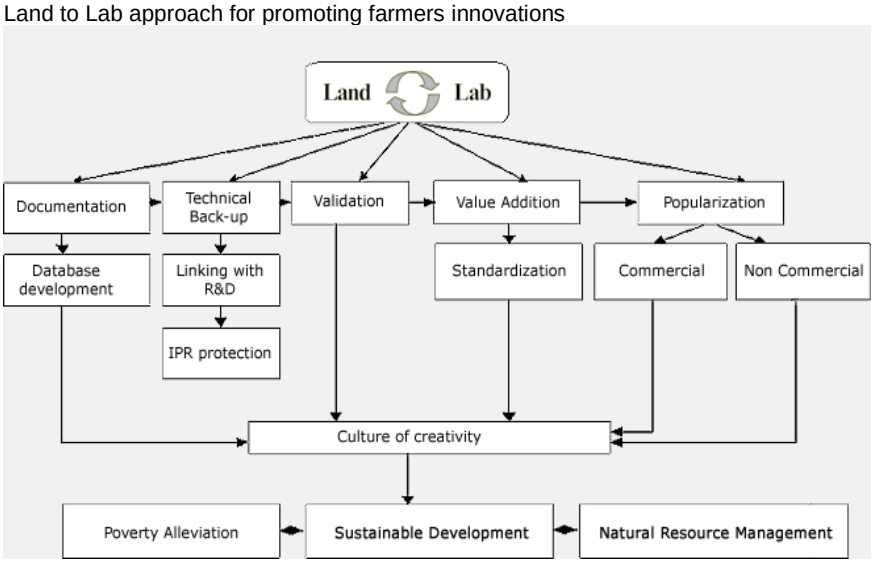
villages. We could find a low-cost drier for cardamom and a farmer-bred cardamom variety which is preferred by the majority of farmers in the district.

In spite of building on local creativity and innovation, we tried to impose technologies from outside, which many times failed to solve the location-specific problems. Research and development activities of formal research institutions overlooked or ignored the practical innovations of farmers and the innovative farmers carried out their work without any formal support from these institutions. Though the research activities of formal research institutes and informal research work of innovative farmers can complement each other, the activities of both innovative farmers and research institutions are going in parallel without mutual support and collaboration. We realized that most of the NGOs and agricultural extension activities of government departments who depended on formal institutes for identifying technologies for the problems faced by the farmers also ignored the contribution of innovative farmers.

The exposure to some of these local innovations and learning the experiences of innovative farmers convinced us of the need for a paradigm shift for technology development by putting farmer's innovation as a corner stone. We also realized that some of the local innovations, with further refinements and improvements, would result in viable low-cost technologies for rural agriculture.

For harnessing local innovation and bridging the gap between land and lab, we developed an approach called 'Land to Lab'. Recently, the Centre for Land to Lab Initiatives (www.pdslandtolab.org) was established under PDS to give focused attention to promoting farmer innovation. Developing technologies at the lab and transferring to the land through various capacity building and training programmes was the conventional methodology followed for development of rural agriculture. Since the process and methodology followed in our approach is just the reverse of conventional technology transfer paradigm, we have termed our approach as 'land to lab' approach. Identifying the farmers innovation and unique traditional knowledge practices from the land and validating and value adding with the help of formal research institutions and facilitating its diffusion for the rural agriculture through the various channels is the process followed in 'Land to Lab approach'.

Land to Lab approach for promoting farmers innovations



Documentation and Analysis

Initially, we focused on documentation of innovations and unique knowledge practices. With the help of extension workers, local media, field officers of agriculture departments and women self-help groups, we were able to identify and document several innovations and unique knowledge practices. These include plant varieties, cultivation practices, pest management, processing, farm implements, veterinary and animal husbandry practices etc.

Various methodologies have been employed for scouting and documentation of innovation and unique traditional knowledge practices. We participated in the national campaign of NIF for scouting grassroots innovations and mobilized a variety of knowledge practices from all over Kerala. We were able to identify a large number of innovative farmers by participating in farmer meets, science exhibitions, networking with other NGOs, farmer clubs, women self help groups, other extension offices of agricultural departments and through advertisements in the media.

These innovations are from diverse fields and, since we do not have expertise to study all these innovations, we realized the need of networking with various research and development (R&D) institutes and other organizations working in the field of farmer innovation to be able to proceed further. We therefore established links with the Honey Bee network and the National Innovation Foundation (NIF), an autonomous body under the Department of Science and Technology, Government of India. Later, we established linkages with other governmental agencies and non-governmental organizations (NGOs).

We visited these farmers and studied their contribution, diffusion of their innovations, acceptability, viability and other details and also cross-checked with R&D institutes for the uniqueness of these innovations. The opinions of other innovative farmers were also considered before proceeding further. The association with NIF helped a great deal in evaluating the innovations. Prior art search was done and details were sent to concerned research institutes for their comments. Based on the formal comments of formal scientists and opinions of model and innovative farmers, innovations were further selected by PDS for development and dissemination.

Short-listed innovations were considered for the national campaign of the NIF and the Honey Bee network for national awards. In a span of eight years, we have been able to mobilize around 10,000 practices and innovations from all over Kerala and more than 40 innovations received national awards from the NIF. In 2001 and 2002, PDS also received a National Award from the NIF for scouting innovations and traditional knowledge.

The methodology developed for mobilizing the knowledge practices of women through their self-help groups deserves special mention. PDS, in association with the NIF, organized a competition specifically for women self-help groups (SHGs) for pooling women-based best innovative practices and outstanding traditional knowledge. The competition was announced formally at the SHG federation-level leaders meeting. Field-level meetings were organized in different villages to explain the competition. Examples of unique practices of women were explained and demonstrated to them. There were large gatherings for these meetings and the women were asked to send a maximum number of practices as entries to the competition. The response was tremendous and we received more than 8000 practices from a single block of the district. These included innovations / traditional knowledge in agriculture, food, fish or agricultural processing, weaning foods, childcare, cultivation, non-chemical pest control, harvesting, storing, preservation, livestock, recipes, heath, nutrition, mechanical technologies, housing, soil and water management, toys, herbal dyes and cosmetics, etc. Even though most of the documented practices of women were traditional and community based in nature, instances were noticed were further improvement and innovation has been made by individuals. For example, a woman in a remote village of Idukki has developed an improved fumigator based on the traditional formulation for avoiding the problems of flies during the milking.

The documentation of local innovations helped to identify several technological gaps in which farmers were found to be innovative. Problems and priorities of farmers of high-risk hilly areas

are different from those in the plains. The formal R&D institutes either ignored these problems or do not have enough exposure in these areas or have not given priority to the technological needs of marginal farmers. The technologies and practices developed for the plains or mainstream agriculture may not be adaptable to high risk areas. Since the market for location-specific technologies is limited, the private sector is also not interested in developing technologies for these areas.

Documentation of farmer innovation sheds light on specific problems they face. Most of the innovations in spice cultivation helped us to realize the problems of spice cultivators, the innovation of the drier brought out the issues in cardamom drying. In cardamom, farmers have developed varieties and harvesting processing methods by themselves. In pepper, farmers have developed varieties, cultivation practices, pest management, harvesting and processing technologies. In nutmeg, farmers have developed unique disease-resistant varieties and processing methods. The majority of the innovations are location-specific, intended to solve problems the farmers faced. In cardamom, we found six farmer-bred varieties adaptable to different microclimates in the same district

Sometimes, the observations of farmers seem to be contrary to those of scientists, but more effective in practice. In cardamom, stem borer is one of the major pests. An innovative farmer indicated that they allow the attack of stem borer to some extent, because it will help to sprout new branches. The innovator's view is totally contrary to the view of scientists, who recommend application of heavy dosages of pesticides to eliminate stem borer.

In pepper, an innovative farmer exposed the collar region of the pepper to sunlight to prevent the dreadful fungus phytophtora, which usually attacks in the collar region. Keeping this part above the soil prevents the possibilities of fungal attack and also allows the drainage of water. This method shows the observation power of innovative farmers.

Once a new practice or method or variety has been introduced, farmers will come up with new observations, modifications and adaptations. When vanilla was introduced in Kerala, the farmers themselves developed, modified and adapted the cultivation practices rather than waiting for advice from research institutes.

The observations made by farmers may also have been made and reported by scientists in some scientific journals, but most of these observations have been independently made by the farmers and adapted to the prevailing conditions. For example, an innovative farmer Divakaran found that the algae *lemna* can be used as feed supplement for quail rearing. Though the nutritive aspects of *lemna* have been reported in scientific journals, this algae had not been tried in quail rearing.

Sometimes, identification of real innovators is very difficult. We have noticed similar innovations from different areas, mostly done independently. In such cases, honouring and recognizing a few innovators may cause negative feeling and apathy among the others. In order to avoid such a situation we study in detail the process and methodology followed by each innovator and their contribution is analysed before honouring them.

It has been observed that farmers from high-risk areas are more innovative than the other farmers. The high risk areas lack basic infrastructure facilities and most of the problems are not addressed by the formal institutes. Generalized solutions and technologies will not address the problems of high risk areas and farmers have to develop their own practical solutions for their survival. Farmers have developed several manually operated water lifting devices and pumps for lifting water from small streams to higher elevations

Innovation development

We made concrete efforts for development of selected farmers' innovations and unique knowledge practices. The innovations and practices relevant to societal development are identified based on the comments of scientists, farmers and other users groups, selected and

subjected to various formal and informal validation processes before value addition. This is done in collaboration with various institutes such as the NIF and concerned research institutes. The specific institutes concerned with innovations are identified and details of the innovations are sent to those institutes for comments. In some cases the institutes depute their scientists for on-farm verifications and for field study. Usually innovations are sent to more than one institute for getting impartial views and comments. At the same time, the status of data on diffusion of the practice /innovation, feed back of other farmers and opinion of local experts are collected from our side. The comments of experts are communicated to innovators for their comments.

Besides we also depute subject experts to visit these innovators for detailed technical documentation. This collected data is cross-checked with the available scientific literature. Scientific testing with all parameters is done in collaboration with these institutes. Scientific testing is easier in the case of farm implements/machinery than agricultural practices or varieties.

Once the innovations are selected, they are provided with technical and financial support for further development of their innovation. Support has been extended to test the innovations at labs and R& D institutes.

Development of innovations and further refining especially mechanical innovations are tedious and time consuming process. Several prototypes have to be made to develop a commercially viable model. The support that we can mobilize is limited and we have encouraged and empowered innovators to explore the possibilities of other financial support. We have organized meetings and facilitated interactions with financial and development organizations for empowering the innovators for the same.

Intellectual property rights (IPR) have been protected and patents have been filed with the help of institutions like NIF on the behalf of the innovators and our role here is of a facilitator. Patents are filed only for such cases which have commercial viability and diffusion potential.

Though patent has been filed and granted, when that innovation is commercialized, the infringements of rights by the third parties have been noticed. Innovator of coconut climber, late Mr Joseph Appachan, has filed a suit against those who copied it, including some private companies for illegal production. Since filing of a law suit involves finances and consumes time most of the innovators do not show interest in litigation.

In the case of the cardamom polishing machine, the innovator is not particular about the IPR aspects. He allowed local mechanics to work on it and they improved the innovation as per the needs and demands of the farming community. Today, more than ten different types of polishing machines based on the innovation of the first innovator are available on the local market.

Dissemination and sustainability

Value-added knowledge practices and innovations are disseminated through various commercial and non-commercial sectors. Non commercial channels include various training programmes, workshops, publications, newsletters etc.

We have been able to develop some unique replicable enterprise models for disseminating local innovations and knowledge practices with people's participation. Enterprise models helped to sustain the activities after the initial support period.

One example is the development and dissemination of a low-cost cardamom drier. A farmer Mr P. J. Abraham in a remote village of Idukki developed a simple drier for curing of cardamom. Traditionally, cardamom is cured in curing houses using firewood. These curing houses are very large and require considerable investment. Marginal farmers cannot afford to construct them. Another disadvantage is that the curing chamber needs a minimum quantity of cardamom for curing. The owners of the chamber usually give the curing unit for rent, after

their use. Since the capacity of the curing chamber is big, farmers need to wait until they have collected enough cardamom for the curing. This affects the quality of curing, and sometimes also theft of good-quality cardamom occurs. Moreover, the curing in this way uses firewood, causing deforestation and other environmental problems.

Stimulated by these problems, Mr P. J. Abraham developed a low-cost curing chamber. We conducted experiments and a detailed study of this novel curing chamber and realized the potential of the drier for marginal farmers. The drier developed by this innovative farmer runs on a gas stove/burner and therefore it costs below four rupees (Rs 4) to dry a kilo of cardamom as compared to Rs 8 in the conventional chamber. Sixty to seventy kilograms of cardamom can be dried in around 24–28 hours. This capacity is ideal for a marginal farmer. The system works without firewood and brings advantages such as low cost, high quality product, high thermal efficiency, less labour, easy operation, time saving and eco-friendliness.

PDS has made efforts to popularize this innovation among marginal farmers with the active involvement of the innovator. The drier was improved and modified with the technical inputs from the experts and given to village developments councils, women SHGs and innovative farmers of Idukki district for drying cardamom. Since considerable investment is needed to set up a new workshop, the innovator outsourced the construction of the drier to a local workshop. Agreements were made with the respective village development councils and women SHGs for giving the drying facility to the public at a nominal rate. A large number of farmers have started to construct the driers on their own; this shows the feasibility of the drier. The local cooperative bank came forward to give loans for installing this drier.

The drier benefited the community in two ways: farmers gain 20% increase in the market value for the produce because of the better drying quality, and the drying costs are reduced. The innovator has also benefits from the profit derived from the selling of drier.

A farmer-innovated pepper thresher and a cardamom polishing machine have been developed with the involvement of innovators and disseminated among the women SHGs as an enterprise mode. The pepper thresher is used for threshing the pepper from the spike. Conventionally, this is done manually, and mostly women are involved in this activity. The job involves drudgery and hardship. The technology developed by Mr. P.K. Ravi from Idukki district is cost effective and works both manually and mechanically. Scientists from the Spices Board and Kerala Agricultural University have studied the technologies in detail and approved it for wider dissemination. Though approval from these institutes is not mandatory for dissemination, such approva has helped the users to mobilize credit from various financial agencies for establishing the units. Besides it has also created more acceptability among the end users. Ten pepper threshers have been established for catering to the needs of ten villages with the support of PDS.

The polishing machine is a technology for polishing the dried cardamom. Traditionally, women are involved in this work, which is done manually. The dried cardamom, just after drying in a curing house, is collected and pressed hard by hand to remove the stalks and to obtain good colour. This job is tiresome and involves drudgery and occupational hazards such as irritation and peeling of hand skin. Acute labour shortage was other constraint in the manual polishing. An innovator from the same district, Mr N. J. Thomas, developed a mechanical device for polishing the cardamom. The technology is cost effective. Ten such units were established in different villages among farmer groups. The technology has solved the problems of labour and also the hardships.

Recently, based on documentation of knowledge practices of women, attempts have been made to establish food-processing enterprises. Four food products were launched based on traditional formulation of recipes.

For the purpose of dissemination and demonstration, a separate Innovators Technology Development Centre for showcasing and exhibiting proven innovations of farmers has been started at Peermade, where more than 40 innovations are exhibited. Special care has been taken to select and demonstrate location specific technologies for the problems faced in the area. The centre has given more visibility for the local innovations and innovators. The centre

also publishes a newsletter '*Let the farmer speak*' in the local language to give visibility to farmers' innovations. This is recognized by the Honey Bee Network as their regional publication.

Innovative practices sometime need innovative methods for diffusion. The farmer breeder Kuriakose's efforts to diffuse rubber seedlings improved by budding are interesting. He was a nursery owner of rubber seedlings. He had both conventionally developed rubber seedlings in his nursery and improved seedlings developed by him. Both the varieties have a similar appearance. His customers did not show interest in the improved seedlings. So Kuriakose, without letting the customer know, put the improved seedlings along with the conventional seedlings in the container without charging any additional amount. The customers took these seedlings to their farms and planted all the seedlings. After one year, seeing the vigorous growth and strength of the improved seedlings, these same customers came back to him and asked for the improved seedlings. In a short span his method has widely diffused all over Kerala.

Another innovator who developed a grinder for arrowroot tubers made an advertisement saying that he would grind the arrowroot tubers with the award-winning grinding machine. This helped him fetch a large number of orders from nearby villages for grinding the tuber. Conventionally, arrowroot is ground manually, which involves a lot of drudgery and hardship.

Formal recognition helps the diffusion of innovation In India; the Spices Board – an autonomous body under The Government of India for promoting spice cultivation – is giving subsidies to farmers for purchasing the farm machinery and quality seedlings. They have included some of the farmer innovations in this scheme. This helped local innovators to market their product and also facilitated wider diffusion.

Media has played a important role in dissemination of innovations Some of the innovations documented by PDS have been widely diffused throughout Kerala mainly due to media support. Media has given interviews and write-ups. Media attention attracted fellow farmers, farm journalists and scientists to study on the innovator's farm. We have requested interested journalists to feature the farmer's innovation in their publication.

It has been observed that innovations in cash crops have diffused more than innovations in food crops. More innovations are also noticed in cash crops than in food crops. There is a noticeable shift from food crops to cash crops in Kerala due to monetization. The cultivation practice developed by a farmer in vanilla has been diffused in entire Kerala in a short span of two to three years. Media has given wide publicity to this practices and high market price for this crop during this period facilitated this diffusion.

Capacity building and empowerment

Capacity building and empowerment of users group and farmers about the local innovators and innovation is very crucial in dissemination. A session on local innovations has been included in all the training programmes organized by PDS for farmers and women groups. The innovations have been demonstrated and training included both practical and theoretical sessions. Field visits are arranged to the farms of innovator for practical exposures. Some of the training sessions were handled by the innovators themselves. A developmental task force among the tribal youth was formed for promoting indigenous/farmer-bred varieties in the tribal areas. These task force members were given intensive training in the cultivation practices of farmer-bred varieties. The task force members established model plots on their farms to facilitate diffusion of the farmer-bred varieties and farmer-developed agricultural practices.

Lessons learned and way forward

- The 'Land to lab approach' facilities and calls for a collective approach from various stakeholders such as research institutes, innovative farmers, NGOs , Women groups for promoting local innovations in sustainable and scientific way. For sustaining and promoting the farmers innovation, various aspects/issues of farmers innovation has to be tackled simultaneously and networking with various agencies is very important. The

analysis of our experiences shows that collective and joint action of various stakeholders such as research institutes, media, NGOs, women groups, farmers, youth and financial institutes helped us to promote farmers innovation.

- The analysis of documentation of local and farmer's innovation has brought out the tremendous potential of local innovation for developing location specific solutions. The documentation of innovations itself is a scientific method for identifying the location specific problems.

- Lack of formal training helped the local innovators to break the rules of conventional research.

- Though traditional practices are community based, further improvement has been noticed by the individuals.

- Close association between formal and informal experts will improve both formal and informal research and will supplement each other. Though there is considerable progress in the relations between innovators and formal scientists, there is still a lack of confidence and trust among innovators with regard to the formal sector.

- Regarding the development of innovations, empowerment of innovators to tap various sources of funding is critical. As compared to agricultural practices and varieties, the improvements in mechanical innovations need considerable financial investments and also consume time. Most of the innovators are from poor socio-economic backgrounds and cannot bear the financial commitments. Identification and involvement of interested mentors is very important for facilitating development and diffusion

- It has been observed that innovators in mechanical/engineering fields are aware of IPR aspects and most of them want to protect their innovation before diffusion. But among the farmers who developed agricultural practices, most are willing to share their knowledge without any restriction or condition. If the innovation is in the open source domain and no IPR conditions are imposed, the further improvement and development of the innovation by other innovators has been noticed.

- Formal recognition has a very good impact on wider diffusion of farmers' innovations. This has helped for media coverage and publicity though the media has facilitated wide-scale diffusion of practices. Support and recognition by the formal sector of farmer innovation will help the innovators to market their product.

- Innovations which have economic and market value have diffused faster. Innovative technologies need innovative methodologies for their diffusion.

- Socio-cultural factors also play a key role in the innovation process.

- Empowerment and capacity building of users in the innovation is very critical in its dissemination

Conclusion

From our experiences, it can be concluded that the 'land to lab' approach is a viable and appropriate tool for developing location specific solutions by promoting farmers innovation. The approach is participatory and involves and calls for the collective involvement of various stakeholders. The approach helped us in identifying location specific problems, technological gaps of high risk areas, developing appropriate technology with participatory approach and its dissemination. The approach provides tremendous scope for supplementing both formal and informal research.

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