Entrepreneurship through Market-Linked Extension: Role of Institutional Innovations

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Abstract

In-spite of tremendous agricultural growth, the challenge is to grow more food to feed the growing population. Innovations have the potential to offer solutions as per local needs and capacities of farming communities; though, technical innovations have to be pursued in association with institutional innovations for their inter-dependence. This paper presents some of the institutional innovations adopted by different organisations to enhance the reach of technology and services to end-users. Some of these models have their focus on innovator/ innovation while others on multiplication and distribution of technology. The focus of innovator-based models is mainly on the development of innovations while models with focus on multiplication and distribution aim at taking already developed technology to the end-users. Institutional arrangements to facilitate Scientist-Farmer interface can also help farmers collaborate to learn from each other. An analysis of the models covered under the study emphasizes on the importance of involving extension machinery in any institutional model adopted by an organisation, private or public, for both developing innovations and taking them to the end-users.

Key Words: entrepreneurship, innovations, market linked extension and institutional innovations

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Introduction

Agriculture has seen tremendous growth since independence in India. Agricultural extension has played a key role in enhancing production by providing knowledge, skills and technologies to the farmers and other stakeholders. Both public and private institutions have contributed immensely through their innovative approaches from time to time. The continuous support has helped farmers and entrepreneurs take their products to the competitive market for better price realisation. Still, the challenge is to grow more food to feed the growing population. Increased expenditure capacities of individuals on food items on account of economic growth and increased income will further expand demands. The challenges faced by agriculture are required to be addressed to achieve the goal of sustained production ensuring wellbeing of all the stakeholders.

Innovations have the potential to offer solutions as per the local needs and capacities of farming communities (Franz and Braun, 2016). Institutions can play an important role in producing innovation-oriented, yet practical solutions to local agricultural challenges (Jane, et. al., 2017). The role of institutions and partnership has also been identified by Ganguly et al. (2017) in their working paper on innovations spearheading the next transformations in Indian agriculture. Technological innovations can no longer be pursued separately from organisational and institutional innovations as each depends on the other. Institutional innovations are not only necessary to ensure the access and use of technological innovations but also to create an enabling environment which rewards grass root innovators for being creative and sharing their knowledge (Franz and Braun, 2016).

Institutional innovations are important not only in helping an innovator establish as an entrepreneur but also in enhancing the access of technology and service to a large number of end users. Taking the importance of institutional innovations into consideration, this paper attempts to compile some of the institutional innovations tried by different institutes to enhance the reach of technology and services. This will supplement the extension efforts of various departments. This compilation is based on the information shared and discussion held during the MSU-MANAGE International Conference on 'Agricultural Extension and Advisory Services - Innovation to Impact' organised during 12 - 14 February 2019 at MANAGE, Hyderabad.

MSU Product Centre

Michigan State University's (MSU) Product Centre is an outreach centre with the mission to support entrepreneurship in the food, agriculture and natural resource sectors of the Michigan economy. The Centre takes care of the skill requirements of aspiring entrepreneurs by providing them with training and coaching as per their needs at different stages of business development.

The Centre strives to build and maintain an ecosystem of support for its client entrepreneurs. At the field-level, there are appropriately trained certified Counsellors/Coaches to work with the entrepreneurs. These are Extension Educators, who dedicate a percentage of their time to the Product Centre. When the counsellors are unable to help a client with technical challenges, they refer the entrepreneurs to the Centre's Campus Staff. When the client's need goes beyond the capability of the Campus Staff, they are referred to other experts available at MSU.

The Product Centre facilitates clients in having access to University resources such as the expertise resident in the Department of Food Science and Human Nutrition, School of Packaging, Department of Agricultural, Food and Resource Economics, Eli Broad College of Business, College of Communication Arts & Sciences, College of Law and Centre for Regional Food Systems among others. The Centre has staff with expertise on a wide range of subjects enabling it to extend support to clients all along the process of business development (Exhibit 1).

Exhibit 1. Details on the expertise available at the Centre and support extended by it to clients

Expertise available at the Centre	Type of support extended by the Centre
* Agricultural Economics	* Business concept development
* Market Research	* Business planning
* Policy Analysis	* Entrepreneur coaching
* Food Science/Food Safety	* Marketing and market research

* Nutrition	* New product development and testing
* Food Processing	* Packaging
* Packaging	* Labelling (Nutrition facts and package design)
* Agri-Food Supply Chain	* Food safety
* Entrepreneur/Business Development	* Making connections with retailers and distributors
* Economic Development	* Feasibility assessments
	* Cooperative development services
	* Impact assessment

In the process, a comprehensive system has evolved with provisions for integrating information and knowledge available with different departments/organisations, thereby making the entire initiative work for the emerging entrepreneurs. The Centre has also developed a facility, called the Food Processing and Innovation Centre, with equipment, infrastructure and food safety licenses to help entrepreneurs develop and validate products and obtain consumers' feedback before making business decisions and investment. The Product Centre offers a complete end-to-end solution to help develop new ideas into full-fledged commercial sustainable enterprises.

MSU Extension's Role with Agriculture Incubators

MSU Extension, as a long-standing partner with local governments, has developed a relationship with an Agriculture Incubator - whose focus is to develop local, marketable innovations, find investors and ultimately, create thriving businesses. The Incubator was established with funding from a local government with the intent to drive job creation, and functions as a private entity. MSU Extension works with the Incubator as an established partner, representing higher education and research-based programming. The partnership model emphasizes outreach to the agricultural community and referral of agricultural entrepreneurs back to the Incubator. The initiative utilizes the long-standing relationship

and reputation that Extension Educators have with the agriculture community to reach individual local farmers for identifying innovations.

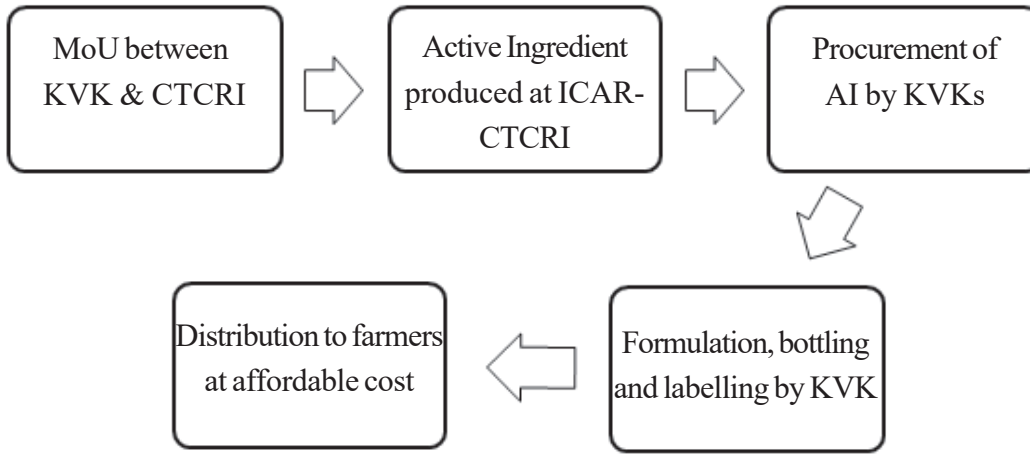
The role of an Extension Educator is to identify local innovations and refer the same to business developers for the rest of the process of development, validation and multiplication. The initiative helped in identification, validation and commercial multiplication of the technologies, though, on occasions, the process of development got deterred by lack of funds availability.

The institution with a focus on incubation has had its positive points like improved reputation but is challenged by various limitations like scarcity of local innovations, difficulty in bringing different organisations and agencies together, inconsequential differentiations of small innovations and inconsistent funding.

ICAR- Central Tuber Crops Research Institute

ICAR- Central Tuber Crops Research Institute (ICAR-CTCRI) has adopted different institutional arrangements for the commercialization of technology in agriculture. The models are being implemented by the Intellectual Property and Technology Management Unit (IPTMU) of the institute along with the Extension and Social Sciences Section. The Unit has a Committee called the Intellectual Property and Technology Management Committee (IPTMU), which is responsible for making different decisions related to IP management and transfer and commercialization of technology. The first model "Contract Manufacturing System" for the distribution of bio formulations with pesticidal properties adopted by the Institute addresses the challenge of developing cost effective production and distribution network of technology. Under the initiative, Krishi Vigyan Kendra (KVK) which is an extension agency operating at the district level, is being used for mixing and distribution of bio-formulations to farmers. Production of the active ingredients and training are the responsibility of the ICAR institute while its multiplication and distribution at affordable prices is the responsibility of the KVK. The advantage of this model is that it helps the farmers to get access to bioformulations at non-commercial prices in their locality (Figure 1).

Figure 1. Taking Biopesticides to Farmers through KVKs Contract Manufacturing System

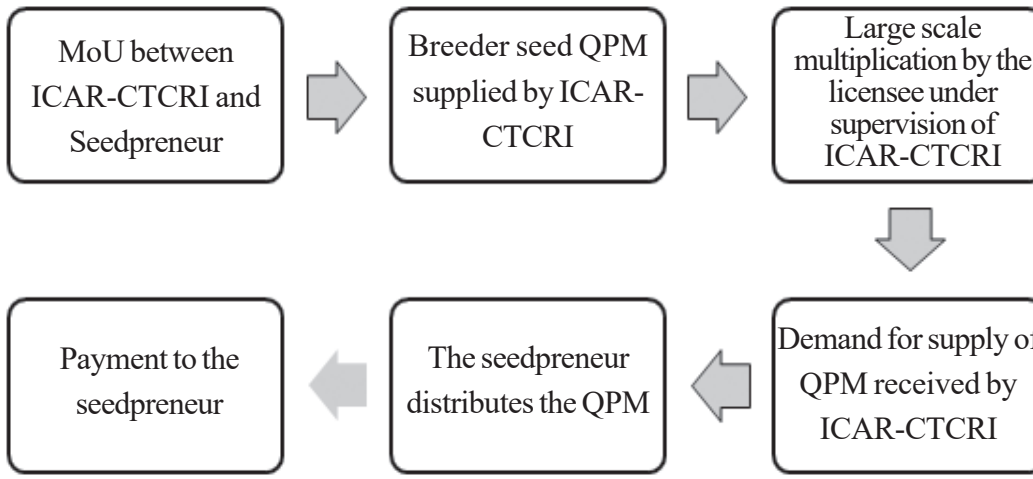


Some of the basic conditions for the association between ICAR-CTCRI responsible for research and product development and KVK responsible for production and distribution are as given below:

* License fee - Rs 25000/- (USD 354)
* Period - Five years
* Technology knowhow - Formulation of Active Ingredient

Another model dwells with developing entrepreneurs for multiplication and distribution of the already developed and tested technology by the research institute. Most of the time, the research institutes are set-up with a focus primarily on research and have a weak link for commercialization of technology. ICAR-CTCRI has successfully experimented with a Public - Private - Partnership model for developing seedpreneur for multiplication and distribution of quality planting material developed by the research institute (Figure 2).

Figure 2. Creating Sustainable Seedpreneurship for Production and Distribution of Quality Planting Material through PPP Mode



The terms and conditions laid down for such association are defined as under -

* License fee - Rs 25000/- (USD 354)
* Period - Three years
* Supply of seed materials by ICAR-CTCRI at current prices
* Field supervision arranged by seedpreneur (Based on Seed Certification Standards)
* Royalty - 2% on profit

Technology Incubation Centre is another "Pay-and-Use" model adopted by ICAR-CTCRI with focus on providing training and infrastructure support for developing value added products. The Centre provides equipment on rent for the development and testing of technologies and products before their full scale production.

Village Incubation Centre, another model, is about offering technological solutions with the locally available resources. The Centre provides local need-based training to help participants develop solutions for their local problems and optimally utilise the available resources. Multi-Institutional Collaborative Village Incubation Centre created at Riha, Manipur (India) in 2015 is having 150 users from two villages. The Centre is generating a revenue of Rs 25000 per year (on an average) since its inception. The Incubation Centre is managed by KVK, Ukhrul, Manipur. However, a need for scaling up with strong market linkages was felt to make the technologies profitable. The multilevel engagement with stakeholders has improved technology development and its transfer process. Such models are suitable to meet demands before a full business model is worked out.

Scientist-Farmer-Interface Programme

Kerala Agricultural University has experimented with a Scientist-Farmer-Interface Programme. The Programme, facilitated by the extension workers, helps in establishing an interface between scientists and selected prominent farmers to work out solutions for local problems. Under the programme, the University organizes discussions to offer case-to-case solutions. There are prominent lead farmers selected from different Gram Panchayats under the programme. These selected farmers use the platform developed for sharing information under the Scientist-Farmer-Interface for bringing their problems as well as the local problems for discussion. The multi-disciplinary team of scientists discusses the problems shared by the lead farmers and suggests case-specific solutions. The solution emerging from the discussion is taken by these prominent lead farmers to the rest of the farmers in the locality. The model is depicted in Figure 3.

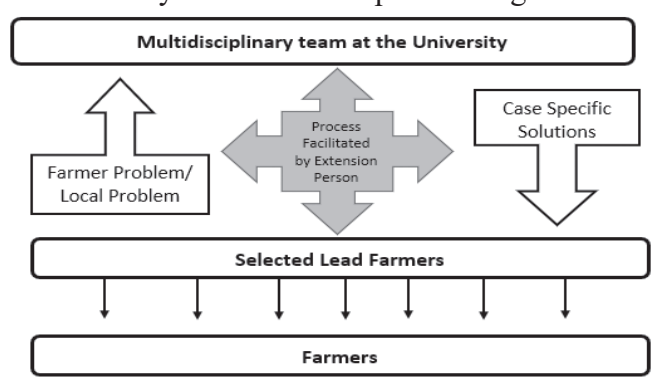


Figure 3. Depiction of Scientist-Farmer-Interface Program

It emphasises on the need of utilizing rural institutions for planning and implementation of development projects at the grass-root level. There is also a need to map the skill requirements of extension professionals in the context of grass-root-level planning and making appropriate arrangements for their training and certification.

Conclusion

Globally, the governments are trying to create a conducive environment by encouraging linkages of agriculture with commercial principles, creation of sufficient infrastructure to support processing and post-harvest management and developing partnership between different players/agencies all along the value chains as per their capabilities and strengths. However, institutional innovations are going to play an important role in the identification and validation of technology with the potential to provide localised solutions and taking the same to end users. However, it is challenging to have an arrangement with the ability to influence the entire process of development and distribution of potential technology. The different models discussed also have their own area of focus. Product Centre and MSU's extension based models have their focus on innovator/innovation. The ground level linkages established under the models in the form of certified counsellor and extension educator help in identifying the innovator/innovations and integrate the same with the rest of the process covering development, validation, multiplication and distribution of innovations. Though, the responsibility of taking the technology to the end user lies primarily with the innovator, there are provisions to provide linkages with retailers and distributors.

In contrast, institutional arrangements made by ICAR-CTCRI focus mainly on taking the technology to the end users in partnership with an agency having ground level presence. The model adopted by ICAR-CTCRI is about identifying the appropriate partner and sharing technology for multiplication and distribution. The model allows ICAR-CTCRI to focus on its strength i.e. research and outsource the component of production and distribution. Under this arrangement, two agencies with their interest and strength are coming together to efficiently deliver the technology to the end users (Exhibit 2).

The strength of innovation-based models like Produce Centre lies in having backward and forward linkages with appropriate institutes. The linkages established with ground level workers like Extension Educator/Counsellor help in identifying and linking the potential

innovator/innovation with the Centre. Its forward linkages with other resources available at the University and linkages with retailers and distributors make it a comprehensive model for identification, development, validation, multiplication and distribution of innovations. This helps in making the innovations available to masses. The entrepreneur is also able to make profits for the innovation and efforts.

Exhibit 2. A component-wise Analysis of different Institutional Models

Components	Product Centre	Extension Based Model	ICAR KVK	ICAR Entrepreneur
Focus	Innovator	Innovator	Technology distribution	Technology distribution
Process will revolve around	Technology, product or service development and its testing	Technology, product or service development and its testing	Identification of extension agency (KVK) and sharing technology for production and distribution	Identification of entrepreneur and sharing technology for production and distribution
Tools for achieving desired results	Training Product development Testing and validation	Identification Validation Multiplication	Agency identification MOU Multiplication and distribution	Entrepreneur identification MOU Multiplication and distribution
Structure	Three tier	Multi-agency	Partnership for endpoint access	Partnership for endpoint access
Infrastructure	Provide	Link to source	Technology only	Technology only
Ground Level Link	Certified Counsellor	Extension Educator	Nil	Nil

The focus of innovator-based models is mainly on the development of innovations. Multiplication and distribution is relatively a weak link in case of ICAR and similar organizations having focus on research and development of technology. Institutional

arrangements can be worked out by involving other public agencies having ground presence or private agencies for multiplication and distribution of already developed technology to the end-users. Institutional arrangements can also help farmers collaborate and learn from each other as suggested by the Scientist-Farmer-Interface of KAU which utilises farmers to take the solutions to other farmers.

Recommendations

Institutional arrangements are important in identification and development of innovations and to take developed technology or services to the end-user as a solution. Some of the recommendations based on the learnings from models discussed in the previous sections are listed below:

(1) The innovators need continuous hand-holding through different stages of the business cycle to help them develop their idea into a sustainable business. Linkages with extension machinery present at ground along with forward linkages with knowledge centres may help an institute to offer an end-to-end solution to the innovators. An integrated approach with KVK scientists linked to knowledge centres like Universities and ICAR Institutes can help in developing a comprehensive system to nurture local innovations.

(2) The innovators will need different sets of skills at different levels of business development. The support institute needs to have a mechanism to provide appropriate training based solution to the innovators as required by them at different stages of business development.

(3) There is a need for different kinds of models for developing ideas coming from a wide range of innovators with potential to offer solutions to different target groups. A partnership model with public institutions responsible to develop and validate innovations and private individual or institutions responsible for distribution is suggested for this purpose.

(4) There is need to collaborate with the rural democratic institutions under local self-governments for widening the interface between extension agencies and other user categories, particularly the small and marginal farmers.

(5) Extension machinery is required to be roped in effectively in both kind of models. In innovation-based models, extension machinery may help in identifying innovations with potential to offer solutions to local issues. Extension system will equally be useful and effective in taking the already developed technology to end-users through multiplication and distribution.

References

Franz W. Gatzweiler and Joachim von Braun (ed.) (2016). Technological and Institutional Innovations for Marginalized Smallholders in Agricultural Development. Springer. https://link.springer.com/content/pdf/10.1007%2F978-3-319-25718-1.pdf

Ganguly Kavery, Ashok Gulati, Joachim von Braun (2017). Innovations spearheading the next transformations in India's agriculture. Working Paper 159. Centre for Development Research, University of Bonn

Jane G. Payumo, Evelyn Akofa Lemgo and Karim Maredia (2017). Transforming Sub-Saharan Africa's Agriculture through Agribusiness Innovation. Global Journal of Agricultural Innovation, Research & Development, 2017, 4, 1-12