

Farm Transition Network (FTN) - A Participatory Approach to Reinvent University Agricultural Extension in India

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ABSTRACT Most of the agricultural universities in India continue to be dominated by top-down, monolithic structures that follow limited extension mandate. None of the post-T&V (Training and Visit System) extension reforms could revitalize it to meet the demands of changed agricultural context. The profusion of uncensored information through mass media and cyber sources has long term consequences of generating public distrust and alienation from agriculture. This is attributed to the lack of a proper mechanism for verification regarding the accuracy and viability of information transmitted. Farm Transition Network (FTN) is aimed at addressing this gap in a demand driven participatory learning mode. It is conceptualized as a highly technical lateral entry intervention by the agricultural university aimed at opinion leaders of agricultural development system. It enables the *hypodermic needle effect* of information by providing a platform for verification of information and utilizing it for evolving alternate options and optimal packages at agro-ecosystem level. It involves integrating research knowledge and local innovations for promoting sustainable livelihood functions into agro-ecosystem management. It identifies agricultural development system as a function of innovation assessment and facilitation sub-system, innovation adaptation and dissemination sub-system and innovation enabling sub-system. Functional processes involved in each subsystem are facilitated through partnerships spread over different levels ranging from agro-ecosystem level of farmer designates to institutional level of SAU. This is further strengthened through the use of satellite farmer groups (SFG) that scale up successful field models into entrepreneurship modules. Major partners and the functional roles performed by each subsystem with characterizing features have been discussed.

INTRODUCTION

Agricultural Universities are the major partners of agricultural development under the National Agricultural Research System in most of the developing countries. In India, there are 41 State Agricultural Universities (SAU) assigned with the mandatory roles of agricultural education, research and extension at the state level. They provide graduate, post-graduate and certificate programs in agriculture and carry out research on location specific problems of different agro-climatic zones of the state. Further, they generate new technology for increasing production in agriculture, animal husbandry, home science and allied sectors. As in most of the developing countries, transfer of technology remained largely the domain of the State Department of Agriculture (DoA) and the SAUs are mandated to serve only

a limited extension role in technology dissemination activities (Sulaiman and van den Ban 2000). Even the limited Extension mandate of the SAUs have conventionally been operationalized through the three major units of Training Unit, Communication and information and Krishi Vigyan Kendras (KVK) or Farm Science Centres. A single window facility of Agricultural Technology Information Centre (ATIC) is also currently established in some SAUs for delivery of research products, information and other services. All the extension activities of SAUs are implemented and coordinated by the Director of Extension. The mandated extension role of SAUs was effective in establishing functional research extension linkages under the Training and Visit system (T & V), which is considered the most significant extension management system in India during the mid-1970s (Feder and Slade 1986). It was well-suited to the rapid dissemination of crop management practices for the high yielding wheat and rice varieties released in India since the mid 1960s. The system largely operated in the inter-personal mode and enabled in bringing professionalism in agricultural technology transfer in India (Picciotto

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and Anderson 1997). It helped to evaluate and perfect the two step communication model in farm technology dissemination through the effective use of progressive farmers as change agents. However, with the withdrawal of World Bank assistance, the T&V system became dysfunctional in almost all the states of the country. The issues of scale, ineffective interaction with the agricultural research systems, inability to attribute benefits, weak accountability, and lack of political support forms the major reasons attributed to its decline (Anderson et al. 2006).

Though the post T&V period saw the emergence of many extension reforms, the role of university extension in the changed scenario was seldom addressed. Most of the changes worked on the limitations of the T & V approach and were aimed at restructuring extension system followed by state DoA into a decentralized and farmer-accountable model. As part of this, many innovations that promoted private agro-service providers, fostering of group approach, broad-basing extension to address marketing issues and innovative use of media and information technology were tried through the state DoA and non governmental agencies (NGOs) in many parts of the country (Sulaiman 2003). However, the field level impact of many of these reforms has been highly uneven and inadequate as it required the coordination of different line departments on which the implementing agency had no control. Reduced funding and shift in national priorities away from agriculture during the liberalization of economy also impeded the effective implementation and scaling up of even successful models on a large scale. Except for Punjab (PAU) and Andhra Pradesh (ANGRAU), no other SAU in the country could evolve a role to fit themselves into the changed scheme of things and continued to operate in the limited extension frame work by focusing on training activities (ANGRAU 2002). PAU and ANGRAU expanded their extension activities to provide a more comprehensive base for the services to farmers by setting up multi-disciplinary SAU teams at the district level that engaged in adaptive research, training and consultancy. Even in recent years with the advent of Agricultural Technology Management Agency (ATMA) as a national extension model to implement location specific programmes related to agricultural development, SAUs have been restricted to consultancy roles (MANAGE 1999; Reddy and Swanson 2006). But the emerging

socio-economic scenario and change in knowledge structure of agriculture explicitly indicate that the traditional agricultural research and extension roles of SAU alone cannot sufficiently address the challenges of the new trends in agricultural development.

It is in this backdrop the paper presents the farm transition network (FTN) as an innovative approach to reinvent university extension from the inadequate and obsolete roles of limited extension and enable it to meet the challenges posed by the liberalized economy and changed information requirements of farmers.

The Premise

More recently, the innovation systems concept has evolved in agriculture development that recognizes innovation as a process of generating and accessing knowledge and putting it into use irrespective of its source (Hall et al. 2001, 2004; World Bank 2006). It discredits the accepted definition of innovation as a new technology developed by scientists, transferred by extension personnel and adopted by farmers. In the changed scheme of things role of extension has also changed from its emphasis from agricultural production to helping farmers organize themselves, and to facilitating resource access and networking (Swanson 2006; Shepherd 2007). However, the university agricultural extension system with its limited extension mandate has failed to incorporate these changes in technology transfer that focus on *interactions* of different people, their ideas and the institutions to create, diffuse and use knowledge. Even after the extension reforms initiated by the Government of India in the eleventh Five year plan, extension systems in most of the SAUs in the country continue to be dominated by the top-down, centralized, monolithic isolated structures. Thus, the universities and research institutes continue to innovate in isolation and the coordination among and between the component actors in research and extension is dysfunctional and poorly linked to the productive sector. Many empirical evidences reveal several linkage gaps that indicate poor and often non-existent interactions and learning mechanisms among the component actors. (Agbamu 2000; Anderson and Gershon 2003). The present university extension almost excludes the field level innovations and adaptations of farmers that are critically dependent on human capacity to make decisions and learn.

The advent of cyber era and extensive agricultural outreach programs in mass media sources has deepened the crisis through an unprecedented profusion of uncensored knowledge and information directly into the agricultural development system. Many investigators reported that the information given through these sources is collectively distorted and suffers from inadequate inquiry and verification. Most of the information given through mass media sources lack supporting evidence regarding authenticity, accuracy and viability leading to long term consequences of public distrust and alienation from agriculture (Reisner 1991; Protess and Mc Combs 1991). The direct and immediate effect of these information sources on the agricultural production scenario is revealed by the research result that 52% of potential agricultural adopters depend on these uncorroborated sources for information for decisions on innovations (Rogers 1995).

The conventional linear technology transfer model in which the university extension operates provides no institutional mechanism to compact the *hypodermic needle effect* of these untutored information sources on agricultural development. Therefore, it is postulated that the growing reports on threatened farm efficiency, shrinking resource base and indebted farming population from all over the country have indirect relation with the use of uncorroborated sources of information. Hence, the emergence of a Research-Extension-Farmer network system at the Agricultural University level has become imperative for reorienting its limited extension role. It should evolve as a convergence platform that facilitates functions and linkages related to the flow and feedback of technology and information in the agricultural system with tangible outcome. It involves enabling the *hypodermic needle model* by adopting an interactive, more inclusive and dynamic framework that empower through farmer networking, quality technological linkages and knowledge flow in the system. The FTN approach aims at achieving this through a highly technical lateral entry intervention by SAU that targets information flow at the entry point by focusing the early adopter category that form the opinion leaders for the society in the information dissemination process due to their high mass media contacts and cosmopolitan characters (Rogers 1962). It is based on the premise that intervention at this level can prevent the

percolation of defective information and non-viable innovations introduced into the system before it gets manifested as a rampant dysfunction. The approach deviates from linear transfer-of-technology extension model to the innovation facilitation model that emphasizes the need to support farmer networking by reinforcing individual learning facilitated by highly trained agricultural professionals (Roeling and van de Fliert 1994). The FTN approach entails a comprehensive framework that ensures institutional technology facilitation and promotion of farmer innovations at field level.

METHODOLOGY

The approach can be implemented at the state level operated at the Directorate of Extension of the SAU under the Project Cell established for the purpose. The activities will be coordinated through the Regional Agricultural Research Stations (RARS) of SAU in all agro-ecological zones of the state. The KVK or the identified monitoring unit of the SAU functions as the coordinating unit at the district level. One Farmer Designate (FD) belonging to the opinion leader category selected from all the panchayats of the state form the target category. All Farmer Designates are e-connected to all the higher levels of operating units through the field facilitator of SAU who will function as the first level link between the district unit and farmer. The project is operated within a participatory action research frame work.

All Farmer Designates are given free access to mass media sources like farm journals, internet information sources, research publications, books, CDs and exposure visits in order to enable them with sufficient information on alternatives that can be tried to improve their farms. They are also issued with a privilege card that includes a copy of their farm profile updated with all the interventions tried, results recorded and also the incentives given. The privilege card entitles him to receive free consultancy and information services from SAU, priority and 10% subsidy for all inputs from University, credit priority in banks and other line department programmes through issued policy guidelines. The State DoA is also involved in legitimizing and facilitator roles at the selection and implementation stages. A brief account of the processes, interactions and outcome of the Farm Transition Network (FTN)

approach conceptualized on these lines has been described.

RESULTS AND DISCUSSION

FTN approach defines the agricultural development system as a function of three inter-dependent subsystems set in the local agricultural development context viz. innovation assessment and facilitation system, innovation adaptation and dissemination system and innovation enabling system (Fig. 1). Functional processes involved in each subsystem are facilitated through partnerships spread over different levels ranging from agro-ecosystem level of FD to agri-business partnerships at state level. It involves enabling the *hypodermic needle effect* of mass media sources by providing a platform for discussion and verification of information. It also helps in utilizing the verified information for evolving alternate options and optimal packages involving research knowledge and local innovations. It facilitates the integration of sustainable livelihood functions of economy,

employment and ecology into agro-ecosystem management. It is further strengthened through mobilizing and streamlining the use of satellite farmer groups (SFG) for scaling up of successful field models at community level. Major partners and the functional roles performed in each subsystem with characterizing features have been discussed.

Innovation Assessment and Facilitation Subsystem

SAU has the functional units operating at the agro-ecological level (Regional Agricultural Research Stations) and district level as the major institutional partners in the innovation assessment and facilitation system. The lateral entry into the agricultural development system at agro-ecosystem level is initiated through selected FDs by field facilitators of SAU. Selection of FD, agro-ecosystem scanning and documentation and technology facilitation and verification form the major system functions. The functions are served through a network of selected FD, SAU scientists,

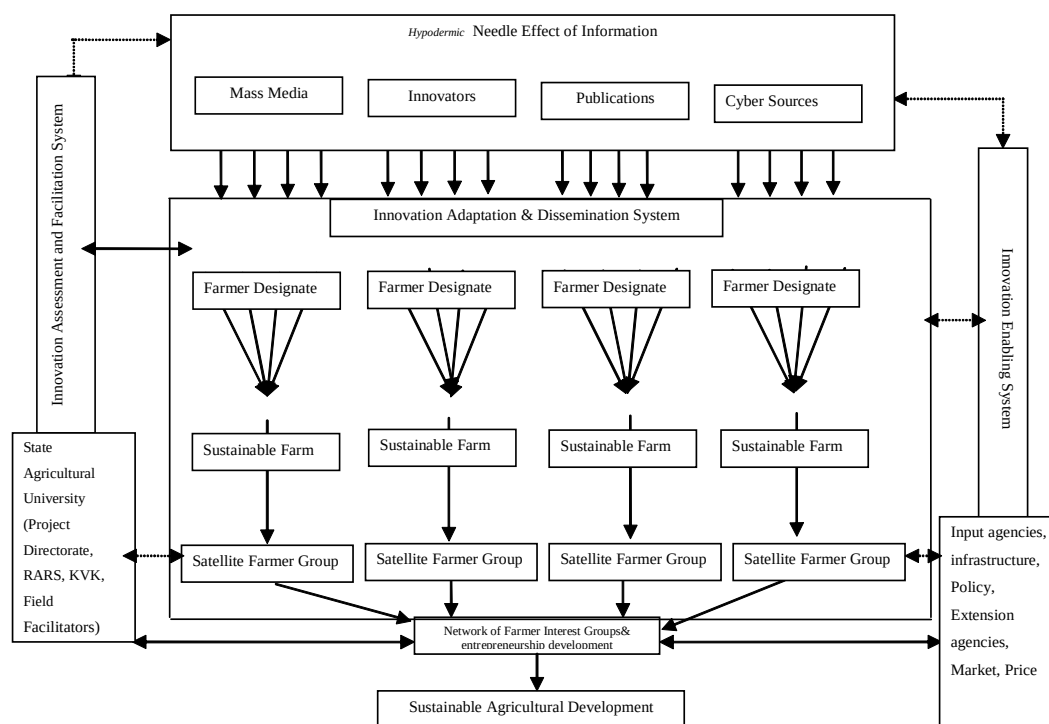


Fig.1. Conceptual model of FTN approach

and field facilitators with technical qualification in Agriculture selected for each district. System monitoring and verification are achieved by electronic interactions and regular monthly visits of field facilitators and University scientists. The facilitation meetings are so arranged that there will be at least one interaction in a month either at the farm or community level. The processes enable the establishment of direct research-extension- farmer linkage in the system mode. It helps to take into account the agro-ecosystem level constraints and potentials of selected FD in technology facilitation. It also aids to strengthen the research and extension capabilities of SAUs, restructure University extension services and test new institutional arrangements for technology dissemination through farmer networking.

Selection of FD: FD assumes paramount significance in the successful implementation of the approach. Therefore the selection of FD follows strict stipulated guidelines issued through open advertisements in prominent mass media channels. The application for FD will be received through all SAU stations of the state and screened based on predetermined personnel and socio-economic characteristics. The potential of the farmer to serve as an opinion leader for the community will be assessed through measurable indicators related to leadership attributes, education, e-literacy, social participation, holding size, scientific orientation, representativeness of farm, mass media contact and experience in farming. A list of variables along with indicators used as a measure is given as table 1. FDs are selected from short listed applicants who serve the prescribed criteria through an interview by a committee consisting of members of DoA, SAU

and extension experts. A state can have as many FDs as the number of its Grama Panchayats, the lowest level under the three tier Panchayat Raj system. Besides the personnel interventions through visits of SAU scientists, field facilitators and local Extension Officers, the FD will have 24 hour e-connectivity with the Project Directorate at the SAU at state, regional and district level through field facilitator for all corroborations and verifications.

Agro-ecosystem Scanning and Documentation: A detailed study of the farm of each FD is entrusted with a facilitation group consisting of SAU scientists, field facilitators, local Extension Officers, panchayat members and KVK members. Participatory Rural Appraisal methodology helps in getting a profile of the farm of FD, natural resource map of the farm and problem solution matrix of the area that is included in the privilege card. This provides the base line data which will be used in the farm development plans.

Technology Facilitation and Verification: Depending on the physical, financial, natural, human and social assets available at the selected farm, appropriate viable technological options selected from all sources are discussed, verified and integrated to revitalize the farm into the sustainable mode. The vulnerabilities of the system, preferred outcomes and livelihood strategies also influence the selection of technologies. Higher economic returns, better employment opportunities, land productivity, efficient use of natural resources and lateral learning opportunities that empower farmers are the outcomes that reduce risk and promote sustainability. It also gears up testing and adapting of technologies according to farmer defined

Table 1: Socio-economic characters and measurable indicators used in the selection of farmer designate

S. No.	Socio-economic character	Identification criteria
1.	Education	Higher secondary and above
2.	Income	> Rs 1,20,000/yr with at least 75% of income from farming
3.	Social participation	Memberships in social forums, organizations etc
4.	Farm size	Not > 2ha
5.	Farming Experience	Not < 20 years
6.	Scientific orientation	Visit to research stations, scientific forums, participation in training programs
7.	e-literacy	Competence in using computers (ownership, technical qualification, hired use etc)
8.	Opinion leadership	Persons with whom regular consultancy is made by the farmers of the locality
9.	Extension participation	Memberships/ office bearer of any group organized and facilitated by extension agencies
10.	Achievement motivation	McClelland's scale
11.	Entrepreneurship	Adoption/ practice of innovations generating income and employment
12.	Cosmopolitanism	Scale devised

needs and thereby bridges the gap between technology generation and use.

Innovation Adaptation and Dissemination Subsystem

Selected FDs and SFGs play the critical functions of innovation adaptation and dissemination subsystem. An understanding of the complexity and diversity of the livelihood strategies followed in the selected farms is used in the integration of new technologies into the farm. It aims at developing a comprehensive farm model which improves the livelihood security of the system at agro-ecosystem level through appropriate technological interventions. Technology facilitation and verification for improving the livelihood security and social facilitation of FSG for validation and dissemination are the major functions served in which the SAU scientists, field facilitator and local Extension Officer have facilitation roles.

Technology Facilitation and Verification:

The identified mode of operationalization is aimed at achieving greater resource use efficiency with biological productivity and environmental sustainability. The interventions are selected from the mass media information sources and corroborated with the available physical resource base of farm in the following major areas as entry points.

- High value speciality crops
- Farm diversification
- Natural resource management innovations

Each mode addresses a definite sustainable livelihood function *viz.* economic production, employment generation, ecological conservation

and farmer empowerment. In order to realize these functions, appropriate technological options identified under each area will be integrated into selected homesteads based on their potentials and constraints. Participatory methods form the basis for the selection of technological interventions. List of technologies identified for each area along with anticipated benefits is given as table 2.

Social Facilitation through Satellite Farmer

Groups: The interventions at the agro-ecosystem level of FD will be further strengthened through mobilizing and streamlining the use of satellite farmer groups (SFG). This helps to scale up and validate successful field models at community level. It makes use of the opinion leadership of the FD in the community who serves as the convener. Local Extension Officer plays a legitimizing role by acting as the chairperson of the SFG. The SFG meets regularly at fortnightly intervals for discussing the interventions tried at the FD farm and other agricultural innovations received through different sources including agricultural issues of local importance. The activities of SFG are coordinated at farm and community level by the FD. Rather than simply being the agents for technologies imposed from outside, the FDs are expected to become catalysts, mobilizing farmers to experiment on an identified need/ solution, recognizing local innovations and helping to assess and encourage them. Experienced farmers thus become the best discussion partners for other farmers. SAU role is limited to social facilitation through networking of SFGs of different agro-ecological zones for entrepreneurship development at regional level.

Membership of group varies, and a group size

Table 2: Technological options for improving the livelihood security of the selected agro-ecosystem

<i>Broad area</i>	<i>Areas of technological options</i>	<i>Anticipated benefits</i>
High value specialty crops	Floriculture Medicinal plants Vegetables Fruit crops	Higher income, Higher yield, Export market orientation, Potential to exploit off-season market demands
Farm diversification	Mushroom cultivation Apiculture Pisciculture Animal husbandry	Employment opportunities, Resilience to market fluctuations, ' Self sufficiency, assured income
Natural resource Management innovations	<i>In situ</i> resource recycling measures (Vermi composting, green manuring etc.) Integrated Pest Management (IPM) Integrated Nutrient Management (INM) Soil and water conservation measures	Reduction in cost of production, Improved farm productivity, Sustainability, Reduction in environmental contamination, Increase in resource use efficiency, Pest and stress resilience

of 20 to 30 is considered ideal and manageable in order to provide face-to-face interaction, better communication and free flow of information. The group approach also plays valuable role in policy advocacy and in realizing economies of scale. One major benefit of the group is that, farmers support each other to learn and adopt. A farmers' network of communication is thus perpetuated in the system that can be facilitated into entrepreneurship mode at regional level and as agri-business venture at state level. Thus farmer-to-farmer extension is amplified at all levels.

Innovation Enabling Subsystem

A sound agricultural extension policy is indispensable to achieve successful utilization of transferred knowledge to farmers. The enabling subsystem represents the agricultural development context that includes the policy environment, infrastructure facilities, input supply facilities, market and extension support system in which the farmers operate. Impact of scientific interventions on farm productivity and livelihoods is influenced significantly by the enabling system and hence is a prerequisite for the successful implementation of the strategy. Institutional and other macroeconomic factors can be sufficiently addressed in such an inclusive extension system which operates in reciprocal interaction at all levels with all subsystems of agricultural development.

CONCLUSION AND RECOMMENDATIONS

Development and adoption of integrated extension strategies that involve research and extension systems along with farmers alone can enable scientific research to achieve a real impact on farm productivity and livelihoods. The main direction of reform in FTN approach is towards this by adopting a learning rather than teaching paradigm in agricultural extension. It is exclusively aimed at reorienting the existing technology transfer systems of the SAUs into an effective participatory system receptive to the changing farmer needs.

The highly technical lateral entry interventions aimed at opinion leaders by the SAUs will in no way duplicate the role of DoA as it addresses the specific extension gaps in existing extension system. It facilitates a shift from conventional technology transfer mode to inno-

ventions in technology management in a participatory mode. It also tries to redefine and share the roles and responsibilities of researchers, extensionists, and local people in the extension delivery network. It promotes partnership in decision making that involves all prospective stakeholders and emphasises sustainable management of natural resources. It shifts the focus from primary production to the entire process and events of full supply chain. Though it provides an integrated approach that can be recommended in diverse socio-cultural, economic and political situations, it is imperative that each SAU makes its own situational analysis of the social, political, technical, economic and natural conditions prevalent in their areas before adapting the strategy.

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