

Agriculture Extension in India – An Overview

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Abstract

Farmers necessitate vast information to sustain their farmhouse activities. Information is required not just on better and best practices & advanced technologies for production of crop which is gained through Green Revolution but as well information about post harvest perspectives including handling, processing, promoting, storage & marketing. Farmers need access to convenient, firm, and pertinent information that can support intricacy inside which their farm activities work. Even though farming expansion today has a wide array, this survey demonstrates that in spite of pluralistic augmentation methods in India, the scope & utilization of the said services are constrained. The purpose of this paper is to analyze rural extension programs in of general society, private and third parts in India. The paper investigates; fundamentals of extension, significance of rural extension, agribusiness extension methodologies in India, general difficulties and limitations of agricultural extension

Keywords: *Information, Agriculture extension, Farming practices, Sustainable Agriculture, Development and Challenges.*

Agricultural Extension: An Overview

The word Extension was taken from 2 Latin words- 'EX'- out and 'TENSIO'- 'stretching which means out stretching. Agricultural Extension means educating the farmers about the advanced technologies of agricultural practices and application of these advanced technologies and scientific research.

Agriculture Extension can also be defined as a system of out-of-school education for rural people or farmers. Agriculture Extension is taking another dimension due to a worldwide development for changing the national extension frameworks in creating nations that began late in the twentieth century. New adapting needs of cultivating groups are rising as the world goes into a time of globalization, privatization and decentralization, influencing

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the farmers of both created and creating nations – but in distinctive ways. There is a crisp and firm fortitude worldwide to battle the hazards of hunger and country impoverishment. Extension specialists, regardless of whether they have a place with government offices, NGOs, private organizations or agriculturist's affiliations, could constitute a considerable drive in this battle. Extension in the creating nations to be sure has another part to play and it needs the genuine consideration of strategy creators for its significant change and modernization.

For agro-technologies to be pertinent to needs, Extension Workers, Researchers and Farmers must assume essential parts in recognizing examination issues, adjusting the proposals to nearby conditions and giving criticism to the researchers about the advancements that have been created. Possible correspondence connections in the middle of Researchers & extensionists are essential in change of mechanical suggestions & in starting further research; such connections give power to new advancements & administration practices to be suited to nearby natural conditions. The support of Extension workers in versatile exploration trials permits them to wind up acquainted with the advancements they are required to elevate furthermore serves to assurance that the sociological dimensions of cultivating are not neglected.

Agriculture Extension in India has developed over the last five decades, regarding activities, hierarchical types and accessible manpower. The State Department of Agriculture (DoA) mainly representing as Public sector extension is playing an important role in providing better information to major farmers. Commotions of other extension organizations, be it NGOs, data agencies, broad communications, research foundations or agriculturists affiliations, however expanding, are still limited to specific areas, products and endeavours. The execution of public sector extension is under investigation for a long while & inquiries are being raised on its ability to supply merchandise in quickly evolving environment.

Agriculture Extension in Developing Countries

Inspite of the fact that purpose of Extension has been casually performed for quite a long time in developing nations but the agriculture extension was introduced formally in 1950s by the faculties who have taken training in United States of America viz. visiting American Professors, agriculture & rural Sciences technical experts, faculty of the University & govt. officials. They were stired up by the American Cooperative Extension Service & related Din

Land Grant College framework, which did agriculture extension & research, expansion & instruction exercises in an amazingly facilitated way. The agricultural extension associations made in developing nations were altogether implied for getting enhanced technologies from agriculture research organizations to convey them to the farmers. The deliverance in agriculture extension includes oral guidance to individual farmers and the group of farmers in their field, home or at common place. They would be trained by showing demonstrations of enhanced technologies in their farms and then doing field days or showing the result of the demo. The awareness and technology transference to the farmers was further empowered by other communication channels for instance, in print material, radio, and, later, TV and videos. In numerous countries, for disseminating of agriculture inputs like seeds, insecticides, fungicides, herbicides and plant growth regulators, the Extension agents were also involved.

Review of Literature

Evaluations demonstrated that 60% of farmers don't get any source of information for advance agricultural technologies bringing about immense gap in adoption (NSSO, 2005). In India, there are around 120 million farm possessions and the number is developing year by year. To give one village extension force to 800-1000 farm families, the prerequisite of field level extension faculty is assessed to be around 1300000-1500000, against which the present accessibility is just around 100000 work force (PC, GoI, 2007). An agricultural development frameworks methodology considers advancement as a systemic process and perceives that development can rise up out of numerous sources, complex associations, and learning streams. Clark, Smith, and Hirvonen (2007) characterized an agriculture extension system as a system of operators whose communications focus the inventive effect of learning mediations, incorporating those connected with logical exploration. Accompanied by the NATP pilot, broad training & monitoring helped situate the ATMA foundations to move in the direction for identifying dynamic markets, farmers and high yielding varieties and crops through PRAs in planning of the SREP (Swanson 2009). Agriculture Extension includes the whole arrangement of associations that support individuals occupied with agricultural production and encourage their endeavors in solving their problems; connection to markets and different players in the rural value chain, & acquire data, aptitudes, and advancements to enhance their livelihoods (Birner et

al. 2009; Davis 2009). The aggregate interest for nourishment grains is anticipated to touch 280 million tons by the year 2020-21. Taking care of this demand will require a development rate of about 2 percent for every annum in nourishment grain generation (Singh, 2011) and farming area need to develop focused on 4 percent for each annum.

Research Methodology

Data have been collected with the help of various secondary sources such as articles, journals, magazines, books, website etc. The main objective of this paper is to study the Agribusiness extension systems in India and general difficulties and limitations of agricultural extension and to bring out the future prospects and Challenges of Rajasthan also.

Significance of Study

This study is mainly focused on the fundamentals of Extension, Significance of Rural extension, Agribusiness extension Methodologies in India. Agriculture extension plays an important role to convey the new and advanced technology to the farmers. For sustainable agriculture, large number of farmers and farming households should be motivated to used new enhanced systems of agriculture. This can be sowing precautions, nutrient management, pest management, IPM awareness, livestock management, seed stock management, and soil & water conservation and so on. Agriculture extension includes all rural development activities.

Fundamentals of Agriculture Extension

The main fundamentals of Agriculture extension is as under:

- Extension can't be suitably gainful in case it meets desires alone, in lack of involvement from the Farm to-market-chain-links (FMCL) performers and associations.
- The functions of an agricultural extension can be done by any person, public or private institutions which are technically sound in Agriculture extension.
- The main basic of Agriculture extension is to provide knowledge and skills to various farmers in order to help them in running their farms efficiently and to improve their life quality as well.
- Any guidance and innovation prescribed by extension workers to the farmers has fewer chances for adoption of new technology if it is not timely available or excessively

costly making it impossible to bear, or excessively unsafe, making it impossible to attempt inside of restricted assets of farmers. Due to low or no selection of such innovation, poor farmers are wrongly faulted as resistant to change.

- Farmers, all over the world are ready to know immediately if they think that the information or technology given to them will be beneficial for their farms as well as their future.
- Agricultural Extension approaches will be different in different locations which mean that the approach or methodology applied in one location cannot be successful in another location and vice versa.

Importance of Agriculture Extension

Agriculture extension provides major support to research and development. The following points describe the necessity of agriculture extension:

- For solving the problems of rural people, agriculture extension plays an important role.
- With the help of agriculture extension adoption of new technologies becomes easy.
- Extension plays an important role in National Development Programs also.
- Extension provides the proper farm and home management.
- Extension gives progressive and better good communities.
- Agriculture extension opens new ways and opportunities to develop leaderships and talents of rural people.
- Extension makes farmers efficient, capable and self dependent.
- Agriculture extension increases the efficiency of marketing, distribution and better utilization of agricultural produce and outputs.

Agriculture Extension Systems in India

During last six decades India has made significant accomplishment by expanding food production four times. Agricultural sector is important to spread the information regarding new technologies and innovative ideas so that farmers can use these enhanced services for his development. Sometimes there exists the gap between the needs of farmers and researchers. For betterment the Agriculture Extension Services are given by the Institutions to overcome this gap.

The Union government basically gives guide through its policies, programs and budgetary help to the agriculture sector. The programs considered toward national level are principally executed by states' through its development divisions. Besides, states also define region specific development programs. Similarly ICAR is a national level constitution which helps the extension & research activities for viable Transfer of Technology models. The State Agriculture Universities also consider on creating development models for technology transfer besides executing the models developed by ICAR framework.

Post- Independence Period

Firstly Community Development Program was launched in 1952 and then National Extension Service in 1953. These programs were launched for educating the progressive farmers to start advanced farming methods in the country. The other main programs based on areas were High Yielding Variety Programs (1966), Intensive Agricultural District Program (1960) and Intensive Agriculture Area Program (1964) in addition Farmers Training Centers were developed for training farmers for adopting improved technologies and high yielding varieties. Due to these programs the productivity increased which further accompanied "Green Revolution during 1970s in India.

To overcome the gap between the resource poor & resource rich farmers other programs were developed like Marginal Farmers & Agricultural laborers Program, Small Farmers Development Agency, District Rural Development Agencies, and Integrated Rural Development Program and Lab to Land program launched by ICAR.

During mid 1980, this came into notice that in developing countries extension services were suffering from various weaknesses along with indulgence of Extension workers, lack of clear communication, low level of agricultural knowledge and field level skill activities. To overcome these difficulties Training & Visit System was introduced in country. And eventually as per the need or requirement many public –sector extension systems, Public-private extension systems, and private sector extension systems came into existence in the country.

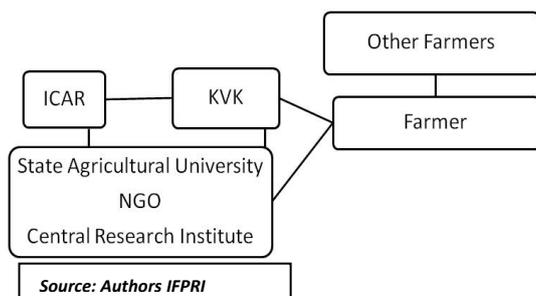
Public Sector Extension System

Ministry of Agriculture, Govt. of India has established the National Institute of Agriculture Extension. This helps the Government of India, State governments and other public sectors to manage efficiently the Agricultural Extension and other agricultural management systems. The following agencies come under Public sector extension:

- Krishi Vigyan Kendra
- Agricultural Technology Management Agency
- State Departments of Agriculture
- State Agricultural Universities

Krishi Vigyan Kendra (KVK)

KVK is a front line agriculture extension centre financed and operated by ICAR. The Indian Council of Agricultural Research (ICAR) has taken initiative to open Krishi Vigyan



Kendras in all the districts of the country. The first KVK was established in 1974 at Pondicherry under the supervision of Tamil Nadu Agricultural University,

Coimbatore. During Commission approved the establishment of 18 KVKs. With the increasing demand of these research centers the process of KVK establishment continued and now there are 641 KVKs in the country. The Scientific Advisory Committee (SAC) is an advisory body to supervise and review the KVKs' activities. This committee is led by the Vice-Chancellor as Chairman, Director of Extension, Zonal Coordinator, ICAR and District Developmental divisions, two farm women and two farmers as a Member and secretary who is Program coordinator. The following are the major activities of KVKs:

Krishi Vigyan Kendras	No. of KVKs
Zone I – 70 KVKs	
Delhi	1
Haryana	18
Himachal Pradesh	12
Jammu and Kashmir	19
Punjab	20
Zone II – 83 KVKs	
A & N Islands	3
Bihar	38
Jharkhand	24
West Bengal	18
Zone III – 78 KVKs	
Assam	25
Arunachal Pradesh	14
Manipur	9
Meghalaya	5
Mizoram	8
Nagaland	9
Sikkim	4
Tripura	4
Zone IV – 81 KVKs	
Uttar Pradesh	68
Uttarakhand	13
Zone V – 78 KVKs	
Andhra Pradesh	34
Maharashtra	44
Zone VI – 70 KVKs	
Rajasthan	42
Gujarat	28
Zone VII – 100 KVKs	
Chattisgarh	20
Madhya Pradesh	47
Odisha	33
Zone VIII – 81 KVKs	
Karnataka	31
Tamil Nadu	30
Kerala	14
Goa	2
Pondicherry	3
Lakshadweep	1
Total	641

- On-farm testing under different farming system.
- To organize Vocational Trainings to the farmers
- To provide consultancy services
- To train the farmers to upgrade their knowledge about advanced agricultural technologies.
- To lay demonstrations divisions
- To provide plant, soil & water testing laboratories.

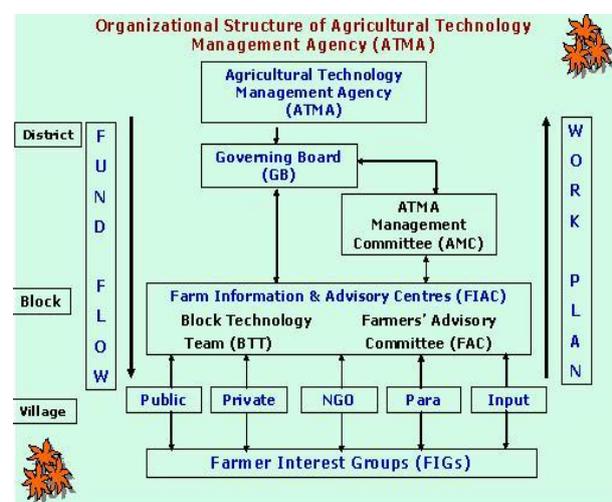
Agricultural Technology Management Agency (ATMA)

The ATMA model is a focal govt. activity of 2005–06 Support to State Extension Programs for Extension Reforms (SSEPER) plan, which was intended to be executed by every state at the area or District level (India, Department of Agriculture and Cooperation 2005). The NATP pilot test was started in 1998 under the Innovation in Technology Dissemination (ITD) part of the National Agricultural Technology Project (NATP) with the backing of the World Bank in 28 regions in seven Indian states. In 2005 the Government of India extended ATMA model to 252 areas under SSEPER, and after that in 2007 to all regions of the nation (Reddy and Swanson 2006; Working Group on Agricultural Extension 2007).

ATMA is a registered society which is responsible for spreading the technology at the district level. Entirely ATMA is assisting agency rather than implementing agency. The funds apportioned for ATMA incorporates Establishment of ATMA office at district headquarters, fortifying of line divisions by giving infrastructural offices, setting up Farm Information and Advisory Centers (FIACs). ATMA can present or demonstrate some projects as inventive model which can be further reproduced by the Farmers' organizations. ATMA should be located at District Collectorate.

Key functions of ATMA:

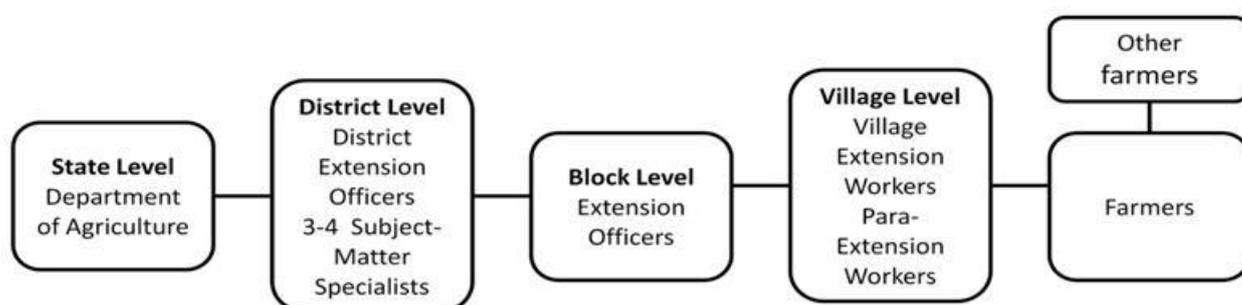
- To identify the problems faced by different socio-economic groups & farmers within the district.



- To arrange demonstrations of new crops & technologies and to provide training to the farmers for increasing their agriculture knowledge.
- To review and approve the Strategic, Extension and Annual plans for the district.
- Review annual reports received from other participatory firm & then providing feedback on same.
- Funds allocation and distribution for research projects and extension activities.
- Facilitating the involvement of private sector.
- Arranging the ATMA financial accounts audit periodically.
- To encourage the agricultural credit institutions for the availability of capital to the poor farmers.

State Departments of Agriculture

State Department of Agriculture (DoA) has the authority to provide provision to Agricultural extension sector and Extension is actualized at State level. Extension is sorted out distinctively in every state, with wide assorted qualities in work force numbers and project focus. The agricultural extensionists of the DoA works at District and Block levels, which are regulatory subdivisions. The numbers and limit of the staff change extraordinarily all through the nation, however it is all around recognized that staff numbers are low.



Source: Authors IFPRI.

State Agricultural Universities (SAUs)

Indian Council of Agricultural Research (ICAR) is the primary administrative power of agricultural education in India. State Agricultural Universities (SAUs) are the magnificent division of agricultural universities in India. A SAU is generally a college set up by an Act of State Council with a committed order of instructing, research and agriculture extension

and related disciplines. The first SAU was established in Pantnagar, Uttar Pradesh in 1960. The SAUs were given self-regulating status and direct financing from the state governments. The SAUs have the responsibilities for agricultural education & training, agricultural research and agricultural extension. Gradually these SAUs research branches under ICAR and became the partners of National Agriculture Research System (NARS). Every state has State Agricultural Universities and the organizational structure differ according to the state. These SAUs gives extension & training activities through Directorate of Extension & Education and activities also differ widely by state. Diagnostic visits to farmers are carried out by these centers on weekly basis.

Public-Private Extension systems:

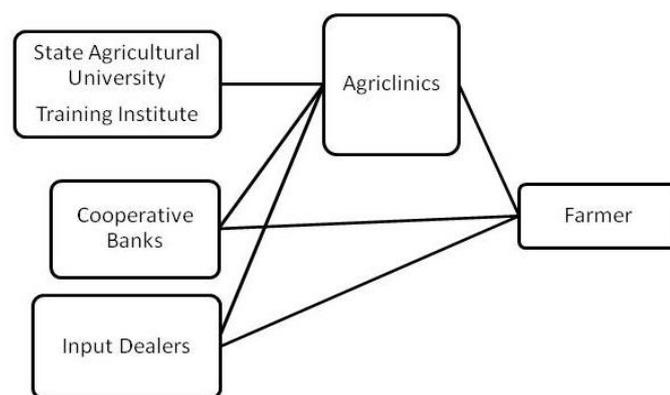
Agri-Clinics and Agri-Business Centers (ACABC) Scheme:

Agri-Clinics are established to provide services and expert advices on various new technologies, soil management, cropping pattern, plant protection, crop insurance, post harvest technology, livestock management to the farmers for increasing the productivity of either crops or animals so that the farmers can increase their income for better livelihood.

Agri-Business Centers are established by skilled Agriculture professionals. These business enterprises may incorporate custom hiring and maintenance, input sales and other activities related to agriculture, post harvest management and business linkages for generating income and development of entrepreneurship.

Both Agri-clinics and ACABC give agriculture consultancy services to farmers at village level through technically trained agriculture graduates called "AGRIPRENEURS". Bank

Loans are accessible for these Agripreneurs to open an agriclinc. 25 percent of the expenses as a subsidy is provided by the Central government. Moreover the states have adopted the methodology and provide their own extra subsidy for agri-clinic execution.

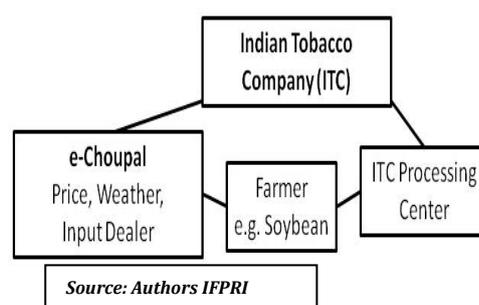


Source: Authors IFPRI

Private Sector Extension Systems

e-Chaupal is an initiative taken by Indian Tobacco Company (ITC) in 2000 for providing agricultural extension services to the farmers. E-Chaupal directly links rural farmers via internet for agriculture and aquaculture products procurement. The company has provided computers and internet access in rural areas across many regions of the country where the farmers can directly offer their produce to ITC. Online access helps farmers to get information regarding good farm practice, Mandi prices, and for placing orders for agricultural inputs. This helps farmers to get the better price for their produce and also helps in improving the quality of their product.

This ITC kiosks viz. e-chaupal is run by Sanchalak i.e. trained farmer. The computer system setup was made at Sanchalak’s house with internet facilities by ITC. There are more than 6500 e-chaupals operating in 40,000 villages in 10 states. E-Chaupal also provides following information to the farmers:



- Broadcasts information (prices, weather and other news)
- Sales of Farm inputs
- Transfers farm management and risk management knowledge
- Provides the alternative output marketing channel facility to the farmers at their doorstep.

Types of Private Extension Providers, Their Objectives and Target Markets

S.No.	Type of Private Extension Providers	Objective of the Firm	Target Market
a.	Farmer Associations	Increase output quantity and quality Increase member farmers' incomes	Member Farmers
b.	Agro-Marketing and Agro-Processors	Backward integration to reduce input supply risks (i.e. product quality, volume and timing)	Contract Growers
c.	Input Suppliers (agrl. machinery, chemicals, seed and plant products, animal foods and veterinary pharmaceuticals)	Product promotion Ensure proper use Preserve market share	All Farmers
d.	Consultancy Firms	Fee for Service	Mostly Large and Medium Scale Farmers

e.	Publishing Companies	Return from Product Sales	All Farmers (mostly large and medium and are literate to read and understand)
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Source: Umali and Schwartz, 1994

Challenges in Agriculture Extension Practices

In spite of the deliberate endeavours made by Public as well as Private Extension frameworks have provided various agricultural extension systems but still the present extension system is found to be inadequate to tackle the farmers' challenges in changing agriculture scenario. The extension system has not reached to the grass root level. The poor extension linkages have caused slow growth in rural development. Extension programs and policies are made for the betterment of rural people but the implementation of these policies in various regions is not used well.

The extension approaches mentioned in the study are facing difficulties in reaching different farmers which means that coordination and partnership between these sectors will help farmers efficiently. Some of the challenges related to these sectors are as under:

Information in the Public sector moves directly, with the motive of Transfer of Technology for increasing the crop production. This is because of the static and resolute nature of association where top to bottom hierarchical approach still continues. Access to increase is moreover an issue, because of the low level of exertion by open extension organizations. This is basically on account of individuals all in all staff being overburdened with completing state and concentrated arrangements, which are moreover not easily changed to suit close-by necessities and conditions (Suleiman 2003b; Suleiman, Hall, and Suresh 2005). There are furthermore inadequate with regards to stores for operational costs, get ready, and breaking point progression, which limits the activities and persevering change of the extension staff (Suleiman, Hall, and Suresh 2005; Swanson 2006). Of the obliged 1.3 million to 1.5 million growth staff required, there are just around 100,000 at work (Working Group on Agricultural Extension 2007). At the state level, the diverse line divisions have been reproved for working in isolation, with slight linkages and phenomenal associations (Suleiman, Hall, and Suresh 2005), which controls information stream. Additionally the research-extension association has been examined for not holding or

using information from farmers and increase staff. Extension work power and agriculturists are confined on-screen characters, and specialists have compelled prologue to handle substances (Reddy et al. 2006). In Public section expansion structure there is duplications of the activities without convergence.

The private sector has a corporate image, working with individual farmers due to which social capital is not built. It has been observed that the private sector can fulfill the needs of commercial and medium sized farmers while public sector can reach to the remote villages of the states which are currently not served well (Swanson 2008).

By considering the large number of small & marginal land holdings in India, Faith Based Organizations (FBOs) and Self Help Groups (SHGs) can play a vital role in communicating and fulfilling the needs of these farmers to understanding mediators. These organizations can work side by side with either public sectors or NGOs but in both sectors the challenges still exists. Open ability to setup SHGs & FBOs are restricted, while NGOs have to depend on trustees or donors for the funds and would also require public support for developing technical skills to encourage the groups (Swanson 2008; Sulaiman & Holt 2002). At the point when farmer groups interface with different organizations, social personalities and other social perceptions mean that they may be very weak to communicate their concerns (Sulaiman & Holt 2002). By promoting the Leadership skills and management skills of such groups so that they can interact without any hesitation and can ask for the information they required, is thus an important component of agricultural extension systems.

Other than the above agricultural extension system is suffering from many constraints like:

- Multiplicity in technology transfer approaches
- Lack of focus of farmers and feedback
- Narrow focus on agricultural Extension system
- Weak research-extension linkage ,
- Poor communication capacity
- Inadequate financial and operating sustainability
- Inadequate technical capacity

Conclusion

Today the Agricultural extension is compulsory. The functions and tasks of an agricultural system are progressively expected by various private and public organizations. Agricultural extension reforms oblige policy vision and determination and a nationwide strategy that can be implemented. Due to the changing environmental and agricultural conditions, farmers need timely, reliable and necessary information which can support their farm activities during the complexity. The study shows that the use and coverage of agricultural extension systems are limited. Considering various small holdings and marginal holdings farmers, mainly in rain fed areas, the major focus is to fulfill the demand of farmers and to provide timely, reliable and relevant information to increase their profitability, productivity and income for their sustainable livelihood.

The Central government is doing significant investments on public sector extension system for implementing transfer of technologies. The constraints are rigid organization, limited staff, poor capacity, weak linkages to the research system and reach to the farmers is limited.

All the Public sector, private sector and third sectors are playing major role in agricultural extension and are reaching to many small farmers, to the remote areas but on the other hand the complexity in Indian agriculture and various farming systems and approaches, the agriculture extension will reach to the farmers more viably than a will concentrate on one system for subsidizing and delivery. Agri-clinics and Agribusiness centers are other facets that can be strengthened and encouraged. The information given to the farmers through public-sector extension systems only focuses in the Transfer of Technology through a linear pathway. In spite of the fact that farmers require information for the entire Food & Agriculture Value chain, the public extension framework focuses on on-farm activities. While the ATMA model endeavors to expand demand driven extension and supports crop diversification, the troubles of execution through the current method of association are extraordinary. The private-division e-Choupal activity and different little scale models have attempted to furnish farmers with information in regards to on-farm production as well as in regards to costs and accessing markets. On the other hand, these methodologies work just for particular products and areas where farmers have the motivation to take risk and are willing to pay for the services.

Suggestions

- Government should develop a new and extended strategy plan for agricultural extension focusing on National food security and income generation for the rural people.
- Extension services should re-evaluate its work or activities periodically and modify the programs or systems according to the changing conditions.
- The agriculture extension officer is the most important link between the research and the farmers. A complete participatory way to deal with agriculture development ought to be supported.
- Linear approach for the development of agriculture extension ought to be debilitated because the farmers ideas and thoughts are forgiven
- For allocating public funds for agricultural extension, Contractual and Competitive mechanisms are two useful methods.
- Government should build a proposal to promote cooperation among institutions and programs in all sectors for developing an efficient extension and information service networks.
- The deceivability of feasible decentralized, democratic, farmer driven, demand driven, lively and participatory institutional mechanism must be ensured.

References

1. R.N. Sharma, S.K. Sharma and B.L. Sharma (2013), Communication Mechanisms of Extension Personnel for Acquisition of Farm Technology in Rajasthan, *Indian Research Journal of Extension Education*, Vol. 13 (May), p 21.
2. Shailesh Kumar, Gyanendra Sharma and V.K Yadav (2013), Factors Influencing Entrepreneurial Behaviour of Vegetable Growers, *Indian Research Journal of Extension Education*, Vol.13 (Jan), p16.
3. S.K. Badodiya, M.K Yadav, O.P. Daipuria and S.V.S Chauhan (2011), Impact of Training programmes on Adoption of Organic Farming practices, *Indian Research Journal of Extension Education*, Vol. 11 (May), p 42.
4. Anaeto F.C., Asiabaka C.C., Nnadi F.N, Ajaero J.O., Ugwoke F.O., Ukpongson M.U & Onweagba, A.E. (2012), The Role of Extension Officers and Extension Services in the

- Development of Agriculture in Nigeria, Wudpecker, *Journal of Agriculture Research*, Vol. 12(June), pp.180-185.
5. Asna, V. K., Sukanya, Som, R. Roy Burman, R. N. Padaria and J. P. Sharma (2014), Socio Economic Impact of Climate Resilient Technologies, *International Journal of Agriculture and Food Science Technology*, Vol. 5 (May), pp. 185-190.
 6. Adhiguru, P., P. S. Birthal, and B. Ganesh Kumar (2009), Strengthening Pluralistic Agricultural Information Delivery Systems in India, *Agricultural Economics Research Review*, Vol. 14 (May), pp. 71-79.
 7. Chandra Shekara, P., and P. Kanaka Durga (2006), Impact of Agri-clinics and Agri-Business Centres on the Economic Status of the Farmer, *National Institute of Agricultural Extension Management (MANAGE)*, Vol. 12(July), pp.25-38.
 8. Clark, N., J. Smith, and M. Hirvonen (2007), Livestock R&D in East and Southern Africa: An Innovation Systems Perspective with Special Reference to the International Livestock Research Institute, *International Journal of Technology Management and Sustainable Development*, Vol. 6 (Jan), pp. 9-23.
 9. Dash, A. K., and M. Mishra. (2004), Overview and Assessment of Past and Current Models, and Future Prospects, *Journal of International Agricultural and Extension Education*, Vol.15 (May), pp. 15-28.
 10. Pratap S. Birthal, Awadhesh K. Jha and Harvinder Singh (2007), Linking Farmers to Markets for High- value Agricultural Commodities, *Journal of Agricultural Economic Research Review*, Vol. 20 (June), pp. 425- 439.