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Agricultural Extension in the Pluralistic Ecosystem in India

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Abstract

Agricultural extension has played a pivotal role in the agricultural development in India. It is turning new leaf every day, adding new dimension to itself. There has been constant evolution of approaches of agricultural extension as it needs to adapt to the new technologies and addressing the complex needs of the diverse clienteles in present changing agricultural scenario. Traditionally, agricultural extension has been associated with transfer of technologies but lately the role of agricultural extension has widened. Besides providing advisory services and technologies, it is now concerned with capacity development, mobilization and sustainability of the farmers and farming community. Decentralization, contracting, privatization, cost recovery, and the involvement of NGOs and farmer-based organizations are some of the major reforms in Extension. Emphasis is now placed on making advisory services demand-driven There was a time when extension services were only provided by the government sector. Slowly, a shift was seen when extension became pluralistic comprising of public, private, cooperatives and NGO's as well, providing a range of agricultural advisory services and facilitating technology application, transfer and management Now, both public and private extension organization is working in the field for the benefit of the farmers. Pluralistic extension has emerged as paradigm shift in the working of the extension system in India. This paper extensively deals with the changing role and nature or agricultural extension in general and in India in particular.

Keywords: Agricultural extension, pluralistic extension, transfer of technology

1. Introduction

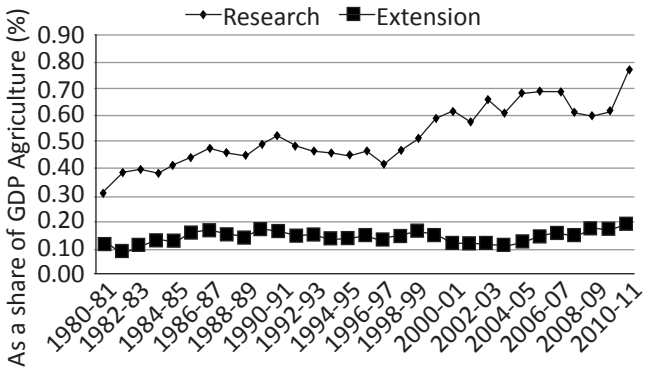
Globally, the world population will reach 9.7 billion by 2050 and India's population will be about 1.7 million surpassing china to become the world's most populous country (UN DESA, 2013). This puts immense pressure on land to feed its burgeoning population. This also creates the problem of poverty and malnutrition accompanied with other socio-economic problems. There has been a gradual change in the agricultural scenario in India and worldwide. Several emerging challenges confront Indian farmers. These include limited land and water availability, which is further exacerbated by degradation of natural resources; climate changes; changes in demand and consumption patterns, moving toward high-value agriculture; increasing population pressure; and liberalization of trade (Lele et al., 2010). As 49% of Indian population depends on agriculture as their primary source of income (NSSO, 2011), enhancing farm income can become panacea of alleviating poverty and malnutrition.

Green revolution embarked the journey of Indian agriculture not only towards the path of self-sufficiency in food grains but also in increasing the farm income. Agricultural extension solely public sector had played a pivotal role in achieving this glorious feat. Agricultural extension has shown its potential in bettering the life of the rural folk worldwide. World development report (2008) also envisaged the need to recognize agricultural extension as a pivot for realizing the growth potential of farm sector against the widening demand–supply pressures, and for ensuring sustainable, inclusive, and pro-poor agricultural and economic development (Singh et al., 2016). But the public sector extension in India has been subjected to lot of scrutiny in recent time (Sontakki et al., 2010; Pal, 2008; Joshi et al., 2005) mainly due to the challenge of enhancing relevance, efficiency, and effectiveness of the public sector agricultural extension system in meeting its organizational goals and objectives remains unresolved (WGAE, 2007; Raabe, 2008; Glendenning et al., 2010; Desai et al., 2011). Agricultural extension has come out of the realm of being a sole public sector enterprise. It is now bestowed with diverse players. Agricultural extension has come a long way from being public to pluralistic, from top down to bottom up and from being transfer of technology to broad based and demand driven. Agricultural extension in the post-Independence era was largely the function of State Departments of Agriculture. Some voluntary organisations were also involved in agricultural development activities in

different parts of the country, but with limited outreach. The Indian Council of Agricultural Research (ICAR) began its participation in agricultural extension through National Demonstrations in 1964 (Sajesh and Suresh ,2016)

2. Investment in Agricultural Extension and Advisory Services

Globally, public investments particularly in Extension were estimated to be at US$6 billion in 1988 (Davis and Heemshrek, 2012). Generally, in agricultural extension much of the funding comes from public sector like the government, World Bank etc. Support for agricultural research, extension, and agricultural education has been around US$120 million per year during 2007 and 2008 by World Bank. Annual lending to these subsectors has fluctuated widely, with lows of around US$100–126 million in some years (2003, 2008, and 2007) and highs of US$499 million in 2006, US$ 582 million in 2009, and around US$300 million in 2010. World Bank investments in extension services often consist mainly of small investments accompanying investments in improved agricultural productivity and market linkages. Notable exceptions have included large investments in research and extension system linkages as well as sweeping reforms of extension systems. World Bank has also supported many extension programmes in India namely Training and Visit System, National Agricultural Technology Project, National Agricultural Innovation Projects and also supported by state level programmes like Rajasthan Agriculture Competitiveness Project. The trend of investment in agriculture extension is changing with large chunks of funding also coming from private sectors. The private sector like ITC, Mahindra and Mahindra limited and IFFCO are investing in extension services. Even foreign companies abo Equity Advisors, the private equity arm of Netherlands-based Rabo Group, Roselnew Oy etc are investing in extension services in India. There has been a gradual increase in the share of inevstment in agricultural in the total gdp from 0.30 per cent in 1990-1991 to 0.77% in 2010-2011 while the increase in the share of investment in extension services in the total gdp has been modest with 0.12% in 1980-1981 to 0.18% in 1990-1991. This share remains more or less in this range for the subsequent years (Joshi et al., 2015) (Figure 1).



Source: Adopted from Joshi et al., 2015

Figure 1: Investment in agricultural research and extension as a share of GDP (agriculture).

This shows that spending on extension is not commensurate with spending on research over time. This has significant policy implications, as lower relative allocations to extension could retard the flow of new knowledge from lab to land, and the gains accrued from higher research investment could be underutilized.

When we compare the proportion of spending between research and extension, it becomes quite clear that major chunks of the investment goes for research with little left to spend on extension. (Figure 2). The share of research in total R&E investment ranged from 65 to 82% during the period. On the other hand, the share of extension in total investment declined from 35% in 1961–1970 to 18% in 2001–2010 (Joshi et al., 2015). This trend is a cause of concern because extension is needed to take the technology from research field to farmers if the benefit of research is to be harnessed.

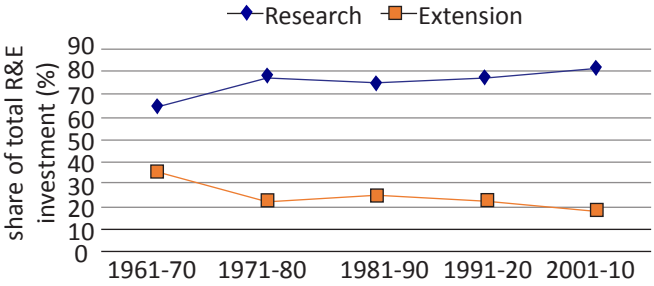


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Figure 2: Share of total R&E in investment between research and extension

The share of investment by state government in Extension is quite high as compared to central government, it is obivous from the fact that the agriculture is a state suject and most of the extension activity is carried out by the state departments. Though the share has shown a decline from being 99.8% in 1961-70 to 79.1% in 2001-2010 but this decline was accompained by increment in the central share of investment in extension activities. The changes in the relative shares reveals that the role of the central government in funding research and extension expanded consistently, mainly because of the upscaling of such activities under the ICAR and other related centrally funded research institutes. In the case of extension, though the states dominate even now, the greater role assumed by the Directorate of Extension and strengthening of the KVKs have resulted in higher central government participation in allocation of resources (Joshi et al., 2015)

The trend in investment in agriculture in India shows the volume of investment has increased 2.6 times in last two decades but there was a gradual increase in share of private investment than public. Presently private sector accounts over 80% share in total investment in agriculture (Figure 3 and 4)

3. Human Resource and Information Access to the Farmers

Due to the changing nature of agriculture, the farmers are

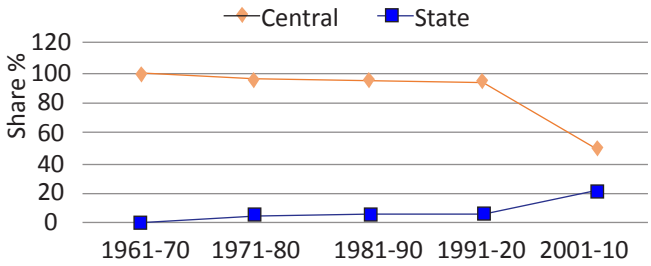

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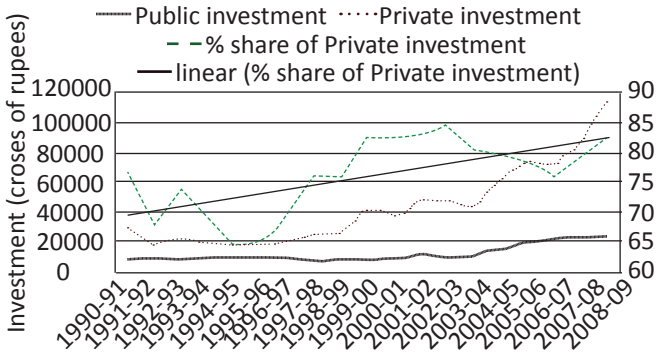
Figure 3: Share of extension in investment between centre and state



Source: Adopted from Mukherjee and Maity (2015)

Figure 4: Investment in Agriculture in India

in need of diverse knowledge on agricultural practices and technology. This requires a good extension personnel to farmer ratio to meet their need. According to Davis the extension worker to farmer ratio is very wide in India, i.e. 1 : 5000 (estimated 60 thousand extension workers) which is far wider than Ethiopia (1 : 476) and China (1 : 625). While Mukherjee and Maity (2015), calculated the extension to farmers ratio in public system to be 1 : 2879. These ratio are quite wide to effectively and efficiently suffice the information requirement of the farmers and moreover public extension personnel are also overburdened with other non-extension tasks. This gap can be complemented by the presence of private extension service providers in the field of agriculture. The only nation-wide survey of farmers' access to extension is the 2003 National Sample Survey Organization (NSSO) 59th round, 33rd schedule on 'Situation Assessment Survey of Farmers'. 60% of the farmer-households in India did not access any information on modern technologies that year. 'Situation Assessment Survey of Farmers' report of NSSO (2003) which was a nationwide survey and 'Situation Assessment Survey of Farmers' of NSSO (2014) which was only for the reference period of July-December2012 highlighted that about only 40% of the famers (households in case of NSSO 70th round) could access technical information from any source. This data shows that extension is not able to make any head way in reaching the unreached farmers of the country. When the source of the information is ascertain, in both the surveys it was the progressive farmers and input dealers from whom the farmers got the information the most. This shows that farmer to farmers exchange still holds the dominant way of acquiring information for the farmers. From a survey of farmer-households, Birner and Anderson (2007) have reported that of the 966 farmer households surveyed, 22% had at least one contact with a government extension worker during the past one year, which was greater than the average of 11.5% reported for Karnataka in the NSSO 2003 survey (NSSO, 2005).

4. Evolution of the agricultural extension approaches in India

The decade of 1950s witnessed the first planned attempt with the launching of Community Development Programme in 1952, followed by the National Extension Service in 1953. These programs were able to educate responsive farmers to take up improved methods of farming across the country. The programmes of 50s and 60s were mainly top down approach with the farmers at the receiving end with no say in decision making. It was a one way process, a kind of "sock it to them" approach as postulated by Rolling. Toward the fag end of 1960s, beginning of green revolution was made which bore fruits in the beginning of 1970s and subsequently, India became self-sufficient in food production. This phase of extension methodologies was characterized by being persuasive and paternalistic. The decade of 1970's saw a major reform in extension. T & V system was introduced in Rajasthan in 1974 with the assistance of World Bank which was later scaled to other states by 1977. This system emerged as major model for knowledge dissemination and extension management in the many developing countries including India. While impressive results were documented by the studies that evaluated the T&V system, the issues related to sustainability of funding, high requirement of staffing, and the quality of staff became the key concerns (Feder et al., 1987; Anderson and Feder, 2004). Being top down approach was also a big lacunae of the training and visit system. As extension practitioners realised the importance of involving the clientele in their work, Participatory technology development (PTD) gained recognition in 1980's. Participation was also based on the concept that innovation and learning does not follow necessarily from top to bottom, but it can come from diverse channels including the farmers. It is educational and participatory approach of extension. Participatory approaches such a farmers field school and farmers group are emerging methodologies and gaining importance. In participatory methodologies, there is a reversal of learning. About a decade ago, in order to introduce reforms in the public sector agricultural extension system and increase its relevance, accessibility, and efficiency of knowledge sharing among various actors, players, and stakeholders, the Agricultural Technology Management Agency (ATMA) was introduced as a pilot (1998-2003) in 28 districts (DAC, 2005). The structure of ATMA was again modified in 2010 incorporating the idea of convergence and participation. Recently, ICAR started the programme farmers first in the twelfth five year plan. The

focus is on farmer's Farm, Innovations, Resources, Science and Technology (FIRST). This initiative, apart from retaining the positive features of the previous programmes, will take the process of the scientist-farmer interaction forward to involve the latter in every stage of technology development - from planning and execution to adoption and promotion of research project outcomes. Such an association will allow farmers to contribute their traditional knowledge and experience to the designing and implementation of research and development projects. This will essentially mean a distinct shift from the conventional top-down approach, which involved developing technologies in research institutes and then asking farmers to adopt them, to bottom-up planning and execution of research programmes (Figure 5).

Figure 5: Approaches in Agricultural Extension

5. Pluralistic Ecosystem in India

The definition of agricultural extension has underwent a lot of change from helping farmers to help them self to the present which discuss about the agricultural innovation system Agricultural extension is an agricultural advisory services, which comprises the entire set of organizations that support people engaged in agricultural production and facilitate their efforts to solve problems; link to markets and other players in the agricultural value chain; and obtain information, skills, and technologies to improve their livelihoods (Birner et al., 2009 and Davis, 2008). Serious operational and financial problems was encountered by Public extension services in many developing countries (Rivera et al., 2001, Alex et al., 2002), which has led to the involvement of many other agencies in extension. Extension services have now become broad based. Though in India, extension services is mainly provided by the public sector, but nowadays private, NGO's and cooperatives societies are also playing active role in this field.

Slowly, a shift was seen when extension became pluralistic comprising of public, private, cooperatives and NGO's as well, providing a range of agricultural advisory services and facilitating technology application, transfer and management. Much emphasis is now given to the demand driven extension. Demand-driven extension is characterized by a shifts from public sector extension delivery to a negotiated system in the stakeholders determine their need and have some control over extension services which are delivered by public, private, NGO's or farmers organizations. Demand' is defined by Neuchael Group as what people ask for, need and value so much that they are willing to invest their resources, such as time and money in order to receive the services. The term is offered as an alternative to the definition of technology transfer and might be defined as an advisory services based on the idea of two way communication promoting knowledge facilitation, knowledge generation and knowledge sharing in a community development context and with the focus on human resource development.

In the last decade, public-sector agricultural extension in India has gained significant focus in policy circles because it is seen as the weakest link in the research–extension–farmer–market chain to increase agricultural growth to the target four percent per year (Parsai, 2010). Considering the importance of agricultural extension, the government of India initiated many reforms in the public extension system to revitalize it. ATMA is considered to be the biggest innovation in the agricultural extension. The frontline extension system are generally the state departments of agriculture. It was considered as panacea of problems crippling the public extension system. ATMA has all the elements of reforms including decentralization, bottom up approach, convergence. Multi agency extension agencies, farming system approach gender participation, block level approach. Some of the successful example of ATMA is from the state of Bihar (Singh, 2007).

Now, ATMA has engulfed with many problems. There is no full-time Project Director and training is handled at state-level training centres that are poorly-equipped. Convergence is limited by a spending cap of less than $200,000 allotted for each district. This amount is shared by different agencies to independently implement a few extension activities, such as training, exposure visits and demonstrations. Moreover, this is only a fraction of the total amount spent by all these agencies independently in the district. Most of the line departments and extension functionaries are not clear about the approach and ways of integrating extension through ATMA (Sulaiman and Hall, 2008) (Figure 6).

Beside state department of agriculture, ICAR is also providing frontline extension through its vast networks Krishi Vigyan Kendra (KVK). Krishi Vigyan Kendra (KVK) had its genesis from report of Mohan Singh Mehta's committee in 1974. The first KVK was started in Pondicherry and ever since there is no looking back. The Planning Commission approved the proposal of the ICAR to establish 18 KVKs during the Fifth Five Year Plan Period (1974-79). Since then, several new KVKs were established by ICAR during each 5 Year Plan Period. At present, there are 651 KVK in the country. The role of KVK's has become important and considered as catalyst of agriculture growth (Singh, 2015). The mandate of KVK has also gone transformation to suit the present farming situation of the country. the mandated activities of KVKs are being changing from time to time in view of the changing scenario of agriculture, to address the newer challenges in the areas of climate change, nutrition linked food security,secondary and speciality agriculture, conservation agriculture, market led extension and agri-business. The mandate of KVK is Technology Assessment and Demonstration for its wider Application and to enhance Capacity Development (TADA-

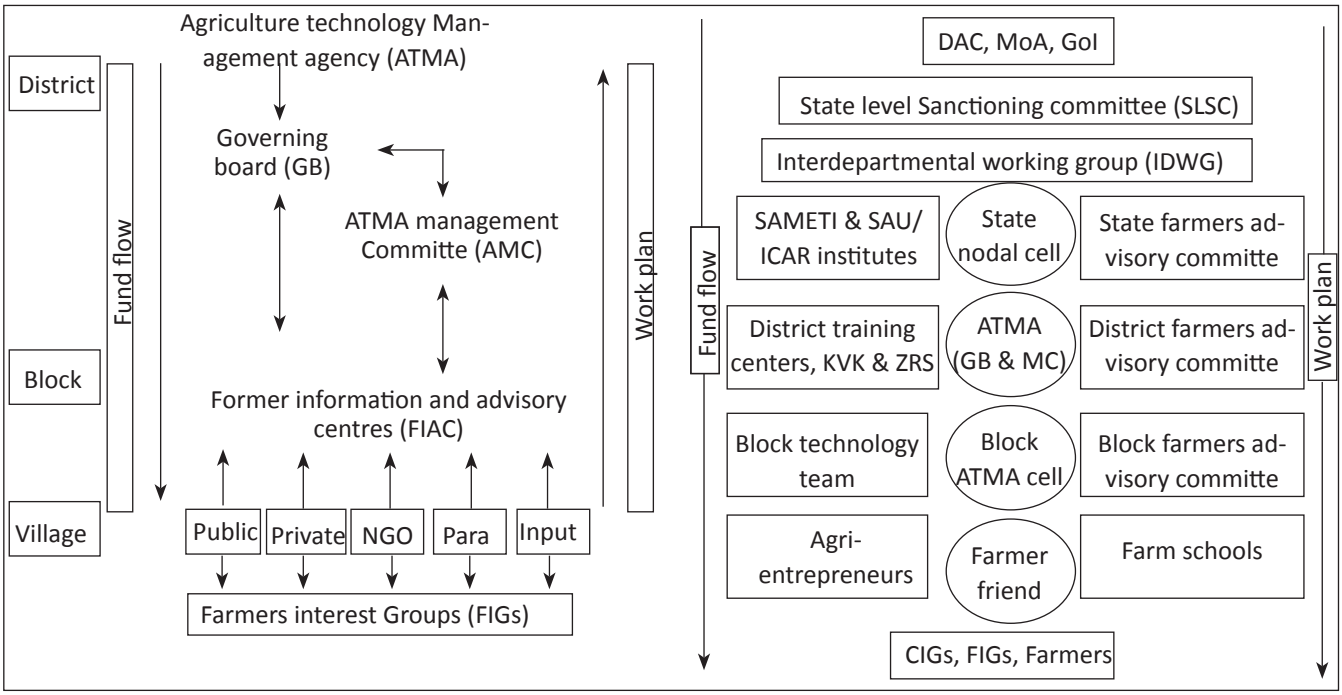


Figure 6: Structure of ATMA (DAC, 2010)

CD). To implement the mandate effectively through creation of awareness about improved agricultural technologies, the following activities be defined for each KVK.

(a) On-Farm Testing (OFT) to assess the location specificity of agricultural technologies under various farming systems.

(b) Out scaling of farm innovations through Frontline Demonstration (FLD) to showcase the specific benefits/worth of technologies on farmers' fields.

(c) Capacity development of farmers and extension personnel to update their knowledge and skills in modern agricultural technologies and enterprises.

(d) Work as Knowledge and Resource Centre for improving overall agricultural economy in the operational area.

(e) Conduct frontline extension programmes and provide farm advisories using Information Communication Technology (ICT) and other media on varied subjects of interest to farmers.

(f) Data documentation, characterization and strategic planning of farming practices. (ICAR, 2014).

The effectiveness of KVKs varies considerably. Accordingly, Gowda (2012) describes KVKs as highly effective, whereas Sulaiman (2012) looks at them more sceptical: "The effective reach of KVKs in most cases is marginal mainly due to its inadequate linkages with other development agencies. Staff shortage, limited operational funding and a narrow mandate has also led to sub-optimal utilization of KVKs"

Changing agriculture from mere subsistence farming to commercialized farming, the entry of people from industrial sector, non-professional agriculturalists, the educated elite, and others to take up agriculture has led to the demand of timely and technically sound advice with reliable market-oriented agricultural extension service. This situation paved the way for emergence of agricultural consultancies and agri-business firms in the dissemination of the agricultural technology (Saravanan, 2001). Private extension has emerged in India and other developing countries as a complement in providing services to the farm community. Private extension services comprises of any person or organization in the private sector, which delivers advisory services in agriculture and is seen as an alternative to public extension (Bloome, 1993). Private extension in India are provided in variety of approaches like consultancy firms, input-cum-advisory extension, agriclinics and agribusiness based extension, contract farming, share cropping, NGO Based extension, Community based Extension, individual consultants etc (Table 1 and 2).

Private extension also has some disadvantages such as focus on high value crops and progressive farmers with large areas, self-interest of profits with less attention on improving the farmer's condition. Though relatively good for higher value crops/commercial crops, it restricts the flow of information and increases social disparity (Singh and Narain, 2008)

6. Convergence of Extension Service Providers

Agricultural extension need to have best of both public and private to reach its full potential. Public-private partnership (PPP) has proved very productive in indian farming situation. The best example of PPP is Honsangabad model. The concept of PPP in Agricultural Extension Management was first introduced in Hoshangabad district of Madhya Pradesh during 2001 where the Department of Agriculture,

Table 1: Options for providing and financing agricultural advisory services

Provision of Service	Financing of Service				
	Public sector (various levels of decentralization possible)	Private sector: farmers (individuals)	Private sector: companies	Third sector: non-governmental organizations (NGOs)	Third sector: farmer-based organizations (FBOs)
Public sector (various levels of decentralization possible)	(1) Public sector extension (various degrees of decentralization)	(5) Fee-forservice extension, provided by public sector	(9) Private companies contracting public sector extension agents	(11) NGOs contracting public sector extension agents	(15) FBOs contracting public sector extension agents
Private sector: companies	(2) Publicly financed contracts or subsidies to private sector extension providers	(6) Private extension agents, farmers pay fees	(10) Information provided with sale of inputs or purchases of outputs	(12) Extension agents from private company hired by NGOs	(16) FBOs contracting extension agent from company
Third sector: NGOs	(3) Publicly financed contracts or financial support to NGOs providing extension	(7) Extension agents hired by NGO, farmers pay fees		(13) Extension agents hired by NGO, service provided free of charge	
Third sector: FBOs	(4) Public financial support to supplied to extension provision by FBOs	(8) Extension agents hired by FBO, farmers pay fees		(14) NGO financing extension agents who are employed by FBO	(17) Extension agents hired by FBO, service free to members

Source: Birner and Anderson (2007), adapted from Anderson and Feder (2004), Birner et al. (2006), and Rivera (1996)

Table 2: Examples of private service providers

Private extension service providers	Year of establishment
Hariyali Kisan bazars (DCM Shriram Consolidated Ltd)	2002
Aadhars (Pantaloon-Godrej JV Company)	2003
Choupal Sagar (Indian Tobacco Company)	2005
Kisan Sansars (Tata Group)	2002
Reliance Fresh (Reliance Company)	2006
Naya Yug Bazaar	1999
Kisan Seva Kendra (Indian Oil Corporation)	2011
Mahindra Krishi Vihar (MKV) (Mahindra and Mahindra)	2001
PRADHAN	1993
BAIF	1967
Centre For Sustainable Development (CSA)	2004
Action For Food Production (AFFRO)	1966
DHAN Foundation(Development of Humane Action)	1998
IFFCO FOUNDATION	1967
Watershed Support Services And Activities Network (WASSAN)	1995

Government of Madhya Pradesh and Dhanuka Group joined together. The National Institute of Agricultural Extension and Management (MANAGE) provided the conceptual framework and facilitated this PPP initiative. The Hoshangabad model has been identified as the first case of PPP in Agricultural Extension Management and shared on different platforms, which aimed at promotion of Public-Private Partnership in Extension. It provided several lessons on operationalising PPPs in agricultural extension (Chandrashekara, et al, 2006). PPP has also been incorporated as an important strategy in the ATMA extension strategy. Many of the ATMAs have developed PPP especially in the area of linking farmers to markets. A good example of this is Baidyanath Ayurveda Bhawan Ltd based in Patna. It has entered in to agreement with growers to buy-back all the herbs/ medicinal supplied by the farmers if they are of good quality. (Singh and Swanson, 2005).

Convergence is required among the various governement agencies and even the private extension service providers. In a true partnership mode, the KVK should function as a frontline extension system, whereas, ATMA to act as a field extension agency for large scale technology dissemination/ adoption. It is proposed that KVKs would work in a "cluster mode", the district level ATMA functionaries could take lead in out scaling of successful technologies/innovations through large-scale demonstrations and further verification/validation (ICAR, 2014). While KVK would have major responsibilities for technology verification and its upscaling, ATMA could

play an important role for large scale dissemination through involvement of mass media (ICT, Radio, TV etc), farmers' organizations, NGOs and private sector. It could also be the major player for public awareness and large scale supply of technology linked inputs. On the contrary, KVK should assume specific role of ATIC through production of seeds, planting materials, livestock materials, fingerlings value-added products, publications, prototypes of small implements, etc (ICAR, 2014). The ATMA has made some progress in the convergence of extension services at the district level. Further convergence of the extension services at all levels requires careful harmonization of work plans of the *Rashtriya Krishi Vikas Yojana* (RKVY), national missions, and other schemes that will require support of the extension services to succeed. Allocation of resources for extension services should be madeunder these national schemes to support the ATMA activities. Beside ATMA, convergence is also observed at lower intensity in other extension agencies also. An important example of convergence is "Convergence of Agricultural Interventions in Maharashtra's Distress Prone District Scheme" (Vidarbha region) and "Rural Bio-Resource Complex Project" in Bangalore Rural district implemented by the University of Agricultural Sciences, Bangalore, since April 2005.

7. Conclusion

Review of extension system in the countries shows that both public and private extension service has its merits and demerits. Extension, in recent time needs synergy between the two systems. There is no best fit for extension system. It depends on the type of agriculture and other situation present in the country. Serious attention should be paid toward the multi-level convergence among various extension service providers

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