Critical Analysis of IARI-Post Office Linkage Extension Model: An Innovative Extension Approach to Reach the Unreached

R. Roy Burman[1], Sujit Sarkar[2], V. Sangeetha[3], S. K. Dubey[4], J. P. Sharma[5], Ishwari Singh[6], K. Vijayaragavan[7] and H. S. Gupta[8]

1. Sr. Scientist, 2&3 Scientist, 6. CTO, 5. JD (Ext.), 7. Ex-Director, IARI, New Delhi, 4. Sr. Scientist, Zonal Project Directorate, Zone IV (ICAR), Kanpur, 8. Director General, Borlaug Institute for South Asia, New Delhi

Corresponding author e-mail:burman_extn@hotmail.com

ABSTRACT

Public-sector extension continues to be the main source of information to a majority of the farmers in our country. With widening ratio of extension worker to the farmer in the country, it has become essential to look for alternative extension approaches that can enable speedy reach of the improved agricultural technologies to the farmers living in the remotest places across the country, largely through the best utilization of the existing infrastructure and manpower resources. Indian Agricultural Research Institute (IARI) recently developed IARI-Post Office Linkage Extension Model using village post masters as change agents for information sharing and technology dissemination to the farmers. The project started with two blocks Sidhauli and Kasmanda in Sitapur district of Uttar Pradesh state in India since rabi *(winter) season 2009. Seven village post offices from five clusters of villages were identified for the study. Majority of the respondents (45.5%) perceived that IARI-Post office linked extension model impacted very highly to increase awareness about IARI varieties. More than half of the farmers (56%) introduction of new variety of major crops had high impact in their area as it changed the seed replacement rate of the area and also the crop diversity of the area. "Covering distant small and marginal farmers" was judged as the major strength of this model and major perceived opportunity was "establishing linkages with KVKs, NGOs and University or research institute (16%)". Findings of the above study indicate the scope for developing post offices as the means of agricultural technology transfer in India. Research institutions may identify technologies and in collaboration with postal department for dissemination of technologies and providing agro-advisory services all over the country.*

Key words: *Post office; Linkage; Extension; Innovative Approach;*

The heterogeneous social, cultural and economic milieu of Indian populace aptly ascribes the agrarian fabric of the country. The diverse nature of the Indian subcontinent, with its wide variety of agro-climatic regions and socio-economic condition of the farmers, calls for agricultural extension approach that are context and situation specific as well as limiting the boundaries of distance. Numerous studies have emphasized the crucial importance of agricultural extension in achieving agricultural and rural development through education and transfer of knowledge, skills and technology (*Swanson et al., 1997; Alston et al., 2000; Davis 2008; Feder et al., 2011*). However, extension systems and delivery methods in many developing countries have been constantly viewed ineffective in responding to the demands and technological challenges of various types of clients and in reaching the rural poor (*Rivera et al., 2001; Davis 2008; Birner et al., 2009*).

Efforts have been made from time to time to raise the productivity of farmers through extension services but their objectives are still poorly met. Farm extension is mainly concerned with two pronged services of information empowerment and technology delivery. ICT led extension service attempts to address the information requirements of extension agents to a great extent. But, the function of technology delivery is the major concern of today. So, a need has been felt for an innovative technology delivery medium through which the technology can be delivered to remote farmers with limited extension functionaries. Thus it is high time to analyze the various extension approaches under changing agricultural scenario to address the issue of technology delivery.

The current extension worker to farmer ratio is very wide in India *i.e.* 1:5000 whereas in case of China it is 1:625 (*Ragasa et al, 2013*). It is on record that about 40% of the field level extension workers are not in position. The percentage may further increase as at least 25% extension workers are in administrative or supervisory position who are not directly in touch with farmers. With remaining extension workers, at least 50% of the time goes for administrative work, official correspondence, works of health department, census works, panchayat departments works i.e. in non-farm activities. In India, out of 143,863 positions in the Department of Agriculture, only 91,288 posts are filled (*Chandra Gowada, 2011*). Combined with the large number of farm households in the country, this small number of positions means that on an average extension services only reach 6.8% of farmers (GFRAS, 2013). About 21,000 agricultural scientists are working in public sector and 70% of them are involved in research on different crops and coming out with different novel technologies but failed to reach the farmers on account of shortfall in extension agent and lack of effective delivery mechanism.

Keeping in mind the above challenges, Indian Agricultural Research Institute (IARI), New Delhi has taken an innovative extension approach for effective delivery of IARI technology through Post Offices for distant farmers.

Rationale for selecting Post-Office as medium to deliver technology: The Indian Postal Services were established in the current format largely under and for the East India Company. The system was reorganized and the service was opened to the general public by Warren Hastings in 1774. In 1835 a committee was set up for unification of custom and postal system of all the presidencies. The result was the first Indian Post office act of 1837. It not only provides for uniform rates and routes but for the uniform designs and other specifications of the postmarks for each category of post office.

The Indian Postal Service, with 1,55,015 post offices (staff strength-474574) of which 1, 39,144 (89.76%) are in the rural areas, is the most widely distributed post office system in the world. On an average, a Post Office serves an area of 21.21 sq. km and a population of 7175 people (*Department of Post, 2011*). This was also empirically confirmed by *Dubey et al (2014)*. Owing to this far-flung reach and its presence in remote areas, the Indian Postal Service is also involved in other services such as small savings banking and financial services. Rural branch post office caters to 5-15 villages and the branch post masters (BPM) mostly are farmers. During the last 10 years, there was a sharp decline (about 50%) in the mail and delivery of ordinary post. Collaborative activities with other agencies (bank, investment agency, insurance departments) increased by 15-20% (*Dubey et al., 2012*).

The trend analysis of post office works showed that during last 10 years (with popularization of mobile), there was sharp decline (about 50%) in the mail and delivery of ordinary post. This has happened mostly after the accessibility and affordability of mobile phone by the rural people and hence, the use of postal communication system was reduced to greater extent. Similarly, the sale of postal stamp and revenue stamp had declined to the same extent. Number of saving account (10%) and recurring deposit holders (50%) showed increasing trends (*Dubey et al., 2014*). This may be mainly because of the fact that Government of India has implemented various employment generating programmes which ensured the sustained income for rural people. Hence, saving in the form of recurring deposit (RD) has an showed increasing trend. The collaborative activities and tie-up with other agencies like bank, investment agency, insurance departments, etc. had also increased (15–20%) (*Dubey et al, 2014*). As a matter of fact that many private players have ventured into basic postal services through couriers and also the sale of revenue stamps has been outsourced by the postal department, the reason for such trends is comprehensible. Moreover, this particular finding helped to conclude the possibility of establishing and sustaining the linkage with post offices. From the experience of Republic of Korea, postal services were found successfully utilized for e-commerce and farming particularly fish farming for marketing of the produce using ICT enabled technologies (*ITU 2010*).

METHODOLOGY

The project started with two blocks Sidhauli and Kasmanda in Sitapur district of Uttar Pradesh state in India since *rabi* (winter) season 2009. Seven village post offices from five clusters of villages namely,

Gandhauli, Neelgaon, Amberpur, Behma, Manwa, Chaudia Manpara and *Rehua* were identified for the study. Later in 2012, the linkages with Post offices were extended to five locations including Buxar district of Bihar state (3 village post offices), Sirohi district of Rajasthan state (3 village post offices), Sheopur district of Madhya Pradesh state (4 village post offices) and Jammu district of Jammu and Kashmir state (3 village post offices). Thus, total twenty post offices were identified to deliver the technologies to distant farmers.

In the first phase, exploratory and descriptive study on possibility of establishing linkages with post office to deliver IARI technology was done. The post office personnel at district, block and village levels were contacted and interacted to see the feasibility of the new extension approach. The analysis of organizational structure and work load since last 10 years was done and then post office personnel were interviewed on different parameters of possible linkage. In the second phase, agro-ecosystem analysis was conducted with the help of local farm science centres called Krishi Vigyan Kendras (KVKs) to identify the suitable crop, variety and other needed technologies. Based on the findings of agro-ecosystem analysis, the improved variety of major crops of that area was disseminated through post office. Then, performance assessment of IARI varieties in terms of yield, quality, income etc. were done and compared with the local varieties.

In the third phase, impact assessment of IARI technology and this innovative extension approach was conducted to trace the primary and secondary consequences of the technology in the society. SWOT analysis of IARI-Post office linkage extension model was also conducted to derive inputs for institutionalizing the innovative approach for technology delivery. At last, the collected data were analyzed and treated with descriptive and inferential statistics like rank, percentage and mean to draw meaningful conclusions.

RESULTS AND DISCUSSION

Exploration of linkage opportunity and possible organizational mechanism : A panel discussion involving researchers, development practitioners, post office personnel and farmers was held to identify the possible institutional and functional mechanism of IARI-Post Office linkage extension model (Fig.1). At the National level, IARI will work as apex institution of technology delivery and a Memorandum of Understanding (MoU) has to be signed with the Director General, Indian Postal Department, New Delhi regarding IARI-Post office tie-up. After identifying the delivery mechanism, the major issue was to find out the operational and implementation mechanism of this new extension approach. At the zonal level, Zonal Project Directorate was consulted to assess the involvement of KVK for technology backstopping and training to the farmers at village level. To begin with, five zonal project directorates were selected to deliver the technology in respective zone. At district level, KVKs were responsible for IARI seed multiplication and training to the farmers on innovative farming practices and technologies. Branch post masters (BPM), the backbone of this programme, were identified for technology dissemination at village level in consultation with the higher officials of Postal Department. The major activities of branch post master were identification of farmers, taking demand from the farmers before each crop season, putting up the demand of total quantity of seed for different crop required for that season, distributing the seed among the farmers, collecting the money from the farmers, regular discussion with the fellow farmers about the package of crop cultivation as

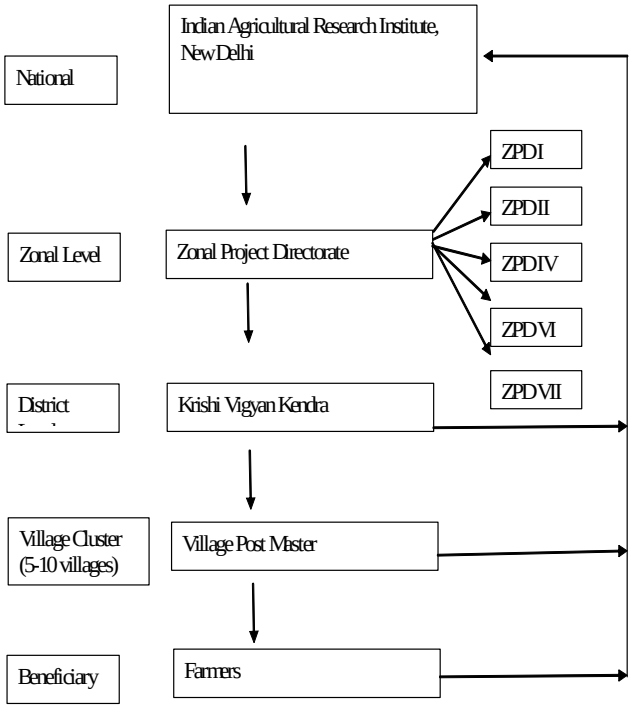

Fig. 1 Institutional and functional mechanism of IARI-Post Office Linkage Extension Model

sent by IARI, establishing model demonstration plot for the villagers and providing preliminary advisory services to the farmers, etc. As an incentive, IARI technologies and seed were distributed to the BPM free of cost.

Dissemination of Crop Varieties : PRA exercise was conducted to identify the major crops, topography, soil health, climatic pattern and choice of farmers. A meeting was held with village *Panchayat,* village post masters, KVK scientists and farmers to sensitize the community about the programme. Out of seven selected post offices, the cluster of villages under *Manwa* and *Ambarpur* post offices represented lesser resource endowed situation like sandy loam soil with partial irrigation facility through tube-well. Participatory discussion with farmers, therefore, helped to identify the priority crops for *kharif* (rainy season) (mainly rice, Pearl millet and long duration pigeonpea), *rabi* (wheat and mustard) and summer (vegetables in some patches). Similarly, the catchment area under five post offices namely *Gandhauli, Neelgaon, Behma, Rehua and Chaudia Manpara* represented fully irrigated situation (through canal as well as tube well) with productive loam soil. Hence, the major crops identified for these areas were paddy and Pearl millet in *kharif;* wheat and mustard in *rabi*; and vegetables like bottle gourd, okra, pumpkin, brinjal in summer as well as *kharif* seasons. Besides seeds, the information packages were also sent to the farmers by post.

By seeing the overwhelming response from the farmers and village post masters, IARI decided to expand the project in five more states (West Bengal, Bihar, Jammu and Kashmir, Rajasthan and Madhya Pradesh). Similarly, popular IARI varieties and technologies were disseminated to all the states based on the popular cropping pattern of the respective villages.

More than 3710 farmers from five states already availed the IARI technological services through post office. Eight major IARI wheat varieties and nine popular rice varieties (both basmati and non-basmati) were disseminated in five states based on the farmers demand. Beside rice and wheat, other poplar IARI varieties like Pusa Jaikisan, Pusa Bold of Mustard, Pusa 383, Pusa 443 of Pearl millet, Pusa Naveen of Bottle gourd, Pusa Viswas of Pumpkin, were disseminated. Over the years, the project expanded both horizontally and vertically. Similarly, the confidence and expectation of farmers from this premier institute also steered up. Now, they are demanding other technological services like fertilizer, pesticide etc beside improved IARI varieties. As a result, IARI started distributing BGA and Pusa hydrogel among the needy farmers.

Socio-cultural impact: Primary data were collected from five districts to discover the numerous socio-cultural impacts in the community beside increase in production and income (Table 1). Total 200 farmers, 40 from each district, were interviewed through stratified random sampling method. Majority of the respondents (45.5%) perceived that IARI-Post office linked extension model impacted very highly to increase awareness about IARI varieties. The mean score of 3.30 indicated that capacity building programme under this extension model raised the knowledge level of farmers about modern cultivation practices and IARI technologies. In this context, a knowledge test was developed and the score of knowledge index was 0.84 which was much higher than the earlier score of 0.38. More than half of the farmers (56%) reported that introduction of new variety of major crops had high impact in their area as it changed the seed replacement rate of the area and also the crop diversity of the area. More than three-fourth of the farmers (84%) respondents highly felt that prestige and social recognition of the farmers in the community increased significantly. This made them "Social Star" in the community. However, the intervention also encountered some feedback. More than one third farmer (33.5%) highly perceived that dissatisfaction among the farmers who did not receive IARI technologies built up which led to social conflict in the area. The prestige and recognition of IARI variety growers also went up due to more yield of IARI varieties (mean score=3.15).

Under the cultural impacts, almost half of the respondents (Mean=2.36) reported that the food habit changed in their area as farmers were cultivating fine grain rice and basmati rice. Their children and family members liked the fine grain more and in special occasion or festival now they were making dishes from Basmati rice. Earlier, only rich farmers could afford basmati rice in festival. Another impact which highly affected the community was change in the communication pattern (Mean=2.49). Now, frequency of visiting Post office and post master increased significantly and post master were acting as opinion leader in the community. Moreover, farmers were not

only getting seed but also became aware of different micro saving and insurance scheme like recurrent deposit, life insurance, pension scheme etc from informal discussion in the post office. As a result, the social network and communication pattern in the rural society changed.

To promote sustainable agricultural development, IARI in collaboration with KVKs trained the farmers on different environment friendly agricultural technologies like IPM, INM, IWM etc. As a result, 30 per cent farmers reported that use of bio-fertilizer increased in the area. However, a large portion of farmers still did not adopt. So, IARI is assessing the feasibility of sending biofertilizer and organic fertilizer to the interested farmers. Similarly, other major impacts reported by the respondents were "adoption of water saving irrigation practices like drip irrigation, lifesaving irrigation etc." with mean score of 2.76. The mean score of 2.5 for "eco-friendly farm management practices like IPM and INM" reflected the average impact on the community. This may be due to complex nature of the technology for which we need more community or group based extension approach.

Economic efficacy: The economic viability of IARI-Post Office linked extension model was assessed considering the cost of cultivation and net income from crop. The seed was distributed free of cost under the project. However, we consider the actual cost of seed if they purchased to calculate the net benefit from IARI varieties. It is clear from Table 2 that from 1000 mt^2 area, a farmer can make net profit of Rs. 3171 with B:C ratio of 1.92 from wheat while in case of Mustard and Bottle gourd the B.C ratio was 4.07 and 2.71 respectively. The findings proved that the model was highly economically viable even if farmers bear the full cost of seed. The major factor for this economic efficacy is the high yield potential of IARI varieties.

Table 1. Socio-cultural impact of IARI-Post Office Linkage extension model

Area of impacts	Major impacts	Degree of Impact				Mean	SD
		Very High	High	Low	Very Low		
Social	Increased awareness about IARI varieties	45.5 (91)	41 (82)	9 (18)	4.5 (9)	3.28	0.80
	Increased knowledge about modern cultivation practices and IARI technologies	46.5 (93)	40 (80)	10 (20)	3.5 (7)	3.30	0.79
	Introduction of new variety of major crops in villages	56 (112)	36 (72)	8 (16)	0 0	3.48	0.64
	Increased prestige of the post master	19 (38)	42 (84)	24 (48)	15 (30)	2.65	0.96
	Dissatisfaction among the farmers who did not receive the IARI seed	27.5 (55)	32.5 (65)	24 (48)	16 (32)	2.72	1.03
	Increased prestige and recognition of IARI variety grower	34 (68)	47 (94)	19 (38)	0 0	3.15	0.71
Cultural	Change in food habit as now the farmers were using fine grain and basmati rice for consumption purpose	8 (16)	39 (78)	34 (68)	19 (38)	2.36	0.88
	Change in communication pattern as the frequency of visiting post master house and post office has increased, now they are acting as opinion leader	12 (24)	38 (76)	37 (74)	13 (26)	2.49	0.86
Environmental	Increased use of bio-fertilizer replacing chemical fertilizer in the area	3 (6)	27 (54)	46 (92)	24 (48)	2.09	0.79
	Adopting water saving irrigation practices like drip irrigation, life saving irrigation etc.	17.5 (35)	49.5 (99)	24 (48)	9 (18)	2.76	0.84
	Adopting eco-friendly farm management practices like IPM and INM practices	12 (24)	39 (78)	36 (72)	13 (26)	2.5	0.86

Table 2. Economic efficacy of seed dissemination through Post Office Linkage

Particular	High Volume crop (Wheat- HD 2733)	Low Volume crop (Mustard- P. Jaikisan)	Bottle Gourd (Pusa Naveen)
Seed sown per farmer	10 kg (1000 m^2)	2 Kg (4000 m^2)	1.5 Kg (4000 m^2)
Total Seed cost	Rs. 300	Rs. 140	Rs. 750
Postal cost	Rs. 129	Rs. 26	Rs. 45
Total Cost (A)	Rs. 429	Rs. 166	Rs. 795
Average Yield (q/1000 m^2)	5.5	2.5	130 q/acre
Gross return (Rs/1000 m2) (B)	Rs. 6,600 (@ Rs 1200/q)	Rs. 6,250 (@Rs 2500/q)	45,500 (@ 350/q)
Cost of production (Rs/1000 m^2) (C)	Rs. 3,000	Rs. 1,371	16000
Total cost accrued (Rs/1000 m^2) (A+C)=(D)	Rs. 3,429	Rs. 1,537	16795
Net Return (B-D) (Rs/1000 m^2)	Rs. 3,171	Rs. 4,713	28705
B:C ratio	1.92	4.07	2.71

Source: Dubey et al (2012)

SWOT analysis of IARI-Post Office linked extension model: SWOT analysis of IARI-Post office linked extension model was done by focus group discussion involving five groups from five states. Total fifty progressive farmers were involved in the discussion process. The major findings are as follows-

Perceived Strength of IARI-Post office Linked Extension Model: The information present in Table 3 showed that the respondents identified 6 strengths of this new extension approach. Among these, "covering distant small and marginal farmers" was judged as the major strength of this model by 17 per cent farmers. This is because of the fact that earlier it was beyond the capacity of small and marginal farmers to avail the IARI varieties due to long distance. The second and third major strength were "Timely delivery of seeds (13%)" and "cost effectiveness (5%) followed by "Technology backstopping through KVKs (14%), "Acting of village post master as local extension agents (15%)" and "advisory service through post office (16%). A very low score of coefficient of concordance indicated that the respondents were divided in their opinion about the different perceived strength. These differences were attributed to the individual differences in terms of need and socio-economic background.

Perceived Weaknesses of IARI-Post office Linked Extension Model: The respondents also reported some weaknesses of this approach based on their experience in last five years (Table 4). Almost one quarter of respondents (24%) reported that "poor monitoring" as the major weakness. The second and third major weakness was "lack of knowledge of village post master (22%) and "low incentive to village post master (29%)". To encounter these weaknesses, IARI already collaborated with KVKs and ZPDs. KVK will be responsible for capacity building of the post masters and farmers on improved farming practices beside seed multiplication. The activities of KVK will be monitored by the respective ZPD. IARI will monitor the overall activities and performance.

Table 3. Perceived strength of IARI-Post office Linked extension model

Perceived Strength	Mean rank	SD	CV	Final rank	%	Coeff. of concordance (W)
Timely delivery of seeds	2.26	0.70	30.97	II	13	0.37
Village postmaster as local extension agents	4.44	0.94	21.17	V	15	
Cost effectiveness	3.64	1.14	31.31	III	5	
Covering distant farmers	2.2	1.10	50	I	17	
Advisory services through post master	4.54	1.28	28.19	VI	16	
Technology backstopping through KVKs	3.92	1.53	39.03	IV	14	

Table 4. Perceived weaknesses of IARI-Post office Linked extension model

Perceived Weakness	Mean rank	SD	CV	Final rank	%	Coeff. of concordance (W)
Poor monitoring	1.72	0.80	46.51	I	24	
lack of knowledge of village post master	1.88	0.69	36.70	II	22	0.20
low incentive to village post master	2.4	0.78	32.50	III	29	

Table 5 Perceived opportunity of IARI-Post office Linked extension model

Perceived Opportunities	Mean rank	SD	CV	Final rank	%	Coeff. of concordance (W)
Scope of linkages with NGO, KVK and University	1.56	0.75	35.37	II	16	
Higher interest shown by postal department	2.32	0.68	29.31	III	22	0.20
High demand of IARI varieties among the farmers	2.12	0.74	47.43	I	24	

Table 6. Perceived threat of IARI-Post Office Linked extension model

Perceived threats	Mean rank	SD	CV	Final rank	%
Local village politics	1.6	0.72	45	I	27
Nepotism shown by postal staff in distributing seed among the farmers	1.8	0.73	40.55	II	20
Change in Postal department policy	2.6	0.61	23.46	III	33

Perceived opportunity of IARI-Post office Linked Extension Model: The respondents perceived that the above mentioned weaknesses can be addressed by exploiting the following opportunities (Table 5). The major perceived opportunity was "Establishing linkages with KVKs, NGOs and University or research institute (16%)" followed by "high demand of IARI varieties (24%)" and "high interest shown by branch post master (22%)". Low score of coefficient of disagreement reflect the disagreement among respondents about perceived opportunity which supported the theory of individual differences. Albeit, "high interest shown by the branch post master" came out as the most agreed strength with CV value of 29.31.

Perceived threat of IARI-Post Office Linked Extension Model: The respondents also perceived some major threats which need to be taken care of while exploring the opportunity. "Local village politics" was perceived as major threat to the model by 27 per cent respondents (Table 6). It was reported that the distribution of the seeds was not objective and uniform among the farmers or villages. Only few powerful or politically active farmers were getting the seeds in some locations. So, they demanded more monitoring in the distribution of seed, conducting awareness campaigning before each cropping season so that every farmer know about it. Then, they proposed the idea of putting demand for seed directly to IARI through a toll free number and then delivering it through post office. Other major threat were "nepotism shown by postal staff in distributing the seed among the farmers (20%) and "change in postal department policy (33%)". So, there is a need of developing a monitoring mechanism on the distribution of seed to effectively reach to remote small and marginal farmers. The third threat was external factor and solved by reaching an agreement with postal department.

CONCLUSION

The new extension approach developed by IARI has the potential to solve the present crisis in state extension department. Most of the states are not having extension agent or full-fledged manpower to deliver the technology at farmers' doorstep which is the demand of 21st century. Moreover, the present revolution in extension mechanism through KVK was hardly adequate to serve a whole district or all the small and marginal farmers. So, there is a need of medium of technology delivery from research centre to the beneficiaries. The findings of IARI-Post office linked extension model proved the viability of considering post office as medium of technology delivery and branch post master as Para extension officers. However, it is not possible for a single research center to cater to the need of crore of farmers. Hence, there is a need of technology (seed) multiplication institution to meet the

demand of crore of farmers. IARI selected KVK as seed multiplication agency who will multiply the IARI variety in their research farm and then will distribute it to all the farmers of the district through post office. The project can be extended in case of other crops and research center based on the cropping pattern of the area. Research institutions may identify technologies and in collaboration with postal department for dissemination of technologies and providing agro-advisory services all over the country. This may lead to the achievement of long desired goal of evergreen revolution and food security.

Paper received on : October 01, 2014
Accepted on : December 03, 2014

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