

Critical Analysis of IARI-Post Office Linkage Extension Model and Strategies for Out-scaling

Alok K. Sahoo, R. Roy Burman, V. Lenin, Sujit Sarkar*, Ph. Romen Sharma**, J. P. Sharma, M.A. Iquebal***

ABSTRACT

The evolution in agricultural extension in India for poor public extension system in large diverse farmers community across the country triggered out the ICAR-IARI to conceive an alternate extension approach with Post Office as service partner and KVK as technical partner bridging the two. The present study was undertaken to elicit strength and limitation of the model perceived by stakeholders and suitable strategies for remedies and further development strategies from focus group discussion with stakeholders. The purposive and random sampling technique with 100 beneficiaries farmers (10 from each Branch Post Office) and 60 non-beneficiaries farmers from two districts Sitapur (Uttar Pradesh) and Buxar (Bihar) along with 10 BPMs and 10 KVK scientists from two districts. "Reaching distant farmers" was major strength (Mean=1.608) followed by "timely delivery of seeds" (Mean=1.925) whereas "advisory service through postmaster" was least important strength perceived by stakeholders (n=120). The major constraint was "selection criteria of beneficiary not clear to farmers" (Rank=1) perceived by beneficiaries farmers. Improper information about seed availability was second severe constraint in Sitapur due to the low rate of assurance about seeds availability to different sectors of farmers by branch post master. Biasness of Branch post mater in selection of beneficiaries was reported as second important constraint in Buxar. Lack of incentive was major constraint perceived by BPMs where as manageable problems were recorded from KVK scientists. The use of mass media, ICT, mobile, proper register maintenance, sensitization program, Community Meeting (Gram Sabha) could be integrated into the model for overcoming limitations and further developmental strategies. The replication of the similar mechanism by several ICAR research institutes and SAUs with more improved technologies (inputs and services) can upscale and outscale the model inside the country.

Keywords: IARI-Post Office Linkage, Extension Model, Strength, Limitation, Strategies, Outscale.

INTRODUCTION

Indian agriculture is in the transition phase from the status of developing to developed country. Majority of farmers are small and marginal with fragmented scattered land holding which many times restrict development due to several challenges are interwoven with poor socio-economic background. Among the challenges, poor public extension system and advisory services are the major concern. Presently, a pluralism of models is being used in most of the countries in Asia and Africa (Anderson and Feder, 2007 and Birmer *et al.*, 2006). There were several innovative approaches started as pilot project worldwide. There were strength and limitation of each and every approach which was less conceived at the time of implementation but was found in evaluation of the approach. Davis (2008) explained innovative extension

approach in Africa where the SG-2000 program searching for a pool of appropriate technology to be transferred first then working closely with the government using national extension workers. These reforms were not changing the system used as much as the approaches within the system. In Uganda, in 2001, NAADS innovative public-private extension approach started with decentralisation, outsourcing, farmer empowerment, market orientation and cost-recovery as strength. (Davis, 2008 and Anderson, 2007). Nyamupangedengu (2016) studied on communication pattern and structural linkages in the agricultural extension which revealed that very weak farmers-extension linkages prevailed whereas neither farmer-research linkages nor research-extension linkages exist.

As we know, the public extension system is repeatedly questioned due to its efficiency and

effectiveness, there is always a scope of alternate extension approaches to complement and supplement it. Several extension approaches are practiced globally in the past and contemporary time. These are like Private based extension, NGO based extension, public-private partnership, fee-based extension, and farmers' organization based extension, privatization of extension services etc. No extension approach is perfect but they are having certain strength and limitations which can be concerned in further extension approaches to providing farmer friendly service. There are innovative approaches like formal institutional linkages and informal networks among extension service providers by both characterized by joint planning, joint implementation (including field visits), division of tasks, and sharing of information and resources. The main difference between informal networks and formal institutional linkages lies in the initiatives and efforts of different organizations, individuals, and local communities to create and maintain them. The informal linkage emphasized one-to-one networking effort to maintain accountability of service. For instance, AGRITEX with several branches enjoys symbiotic relationships with various other agricultural extension service providers, from which both parties stand to benefit (B.T. Hanyani-Mlambo, 2002). This linkage mechanism can also be realized in Public-Public partnership where resource sharing would yield efficient and effective extension service.

With a dire need of enhancing the outreach of the public extension system in India to reach out the huge mass of farmers scattered throughout a diverse climatic and geographic location, ICAR-Indian Agricultural Research Institute designed an innovative extension approach IARI-Post Office Linkage Extension Model in 2009 as a pilot project in Sitapur district of Uttar Pradesh. In 2013-14, the model has been expanded to 55 districts of 14 states to strengthen the extension network in the country. Under this model, village level postmasters and farmers are trained in improved farm practices with the help of local KVKs (Krishi Vigyan Kendra). Demonstration of improved IARI varieties on the farms of village postmasters became the place of learning for other farmers that led to "Farmer to Farmer" seed sharing. Postmasters became paraextension agents for the ICAR-IARI with the help of KVK.

The model has been successful in several areas but there are some lacunas observed in previous studies. There is an imperative to analyze the strength and limitation of the model critically to find out the roadmap for future upscaling and out scaling of technologies. As part of the researcher study, one of the objectives was to explore strength and limitation and scope for its replication.

METHODOLOGY

Ex-post-facto research design was used. A survey with structured and semi-structured interview schedule was conducted. Focus group discussions, observations methods were used to get more in-depth insight. To record the impact of a model a period of active intervention is essential. The impact assessment was a broader area of study where critical analysis on strength and limitation of the model could be explored. The study was conducted in Sitapur district of Uttar Pradesh and Buxar district of Bihar states where the project started in 2009 and 2013 respectively. In 2012-13, the model was expanded to another four districts, viz. Sirohi (Rajasthan), Buxar (Bihar), Sheopur (Madhya Pradesh) and Jammu (Jammu & Kashmir). Buxar among above four districts have been selected along with Sitapur purposively as in these two districts technologies related to both low volume and high volume crops were disseminated through this model and similar agro-ecological conditions prevail. There were likely similar cropping pattern in two districts where paddy, wheat, mustard, vegetables etc. were considered for research study due to improved varieties seeds of above crops were disseminated through the model. Seven villages namely Amberpur, Manwa, Dakhinawa, Chauriya, Gandhauli, Neelgaon and Rehua from Sitapur district of Uttar Pradesh were purposively selected as the locale of the study because initially IARI-Post office linkage extension model initiated with these seven Branch Post offices. Similarly, Kukuda, Chhuni and Unwas villages from Buxar district of Bihar were selected purposively as in the second phase of extension of the model these post offices were identified.

The respondents were selected using purposive and random sampling techniques. The respondents for the study were the beneficiaries and non-beneficiaries of IARI-Post Office linkage model. The list of IARI-Post Office Linkage model beneficiaries was taken from each BPO and ten (10) respondents were selected from each BPO area by simple random sampling technique. Thus, a total of hundred beneficiary farmers were selected from ten BPO areas of both the districts. Thirty (30) non-beneficiary farmers from each district were also selected randomly. Thus, a total of sixty (60) non-beneficiary farmers were selected as a control sample. Ten (10) officers of both the KVKs namely Sitapur and Buxar were selected by stratified random sampling. All ten (10) Branch Post Masters from seven (7) Branch Post Offices in Sitapur and three (3) Branch Post Offices in Buxar were selected. Thus, the sample comprised of total 180 respondents including officials. Both primary and secondary data collection methods were used. The primary data were collected

through survey method using interview schedules (structured and semi-structured), focused group discussion, and observation as major tools. The secondary data were collected through annual reports of respective KVKs, literature published by various Government/ non-government agencies and reference materials available on websites. The probable strength and weakness of the model perceived by the stakeholders were taken into consideration at the time of schedule preparation. Statements were made in keeping a view on major strength and weakness perceived after a detailed review of the literature. The respondents ranked them and mean rank was calculated. Appropriate descriptive and inferential statistics were used to analyze the data.

RESULTS AND DISCUSSION

A) Strength of IARI-Post Office Linkage Extension Model as perceived by stakeholders

Any extension model has internal strength and weakness along with external threat and opportunities. The SWOT analysis helps to provide direction for the model which can facilitate in achieving its goal and objectives. The critical analysis will help in planning future strategies and managing the model operation. One of the Ph.D. study suggested SWOT analysis would develop strategies which could strengthen the weak areas or take advantage of the strengths and opportunities (Anonymous, 2017). With this view, an attempt was made to analyze the strength of the IARI-Post office Linkage Extension Model for further strengthening with the fullest utilization of positive points. The obvious strength of the model is well known to the researchers and implementers but there was an attempt to explore the views of stakeholders for conforming and validating the model intention. Some major types of strength were identified from models framework, objective, and goal which were administered and classified according to importance ranked by the respondents. The result from the study showed that “reaching distant farmers” was major strength followed by “timely delivery of seeds” whereas “advisory service through postmaster” was least important strength perceived by stakeholders (Table 1). “Branch postmaster as local extension agent” and “cost-effectiveness” was perceived as third and fourth important strength by stakeholders. There were mostly similar findings but a little contradiction with previous studies investigated by (Burman *et al.* 2015). Similar strength of another innovative public extension model like Contacting farmers through help of (FIGs/SHGs) were “reducing the extension cost” and “workload of extension functionaries to a greater extent” supported by Meena *et al.* (2015). From multiple

pairwise comparisons of given strengths of IARI-Post office Linkage Extension Model perceived by stakeholders of both the district (n=120) using Nemenyi’s procedure in Table 2, there was a significant difference in three groups of strength as reaching distant farmers and timely delivery of seeds were major strength followed by Branch post master as local extension agent and cost-effective model as medium strength group, whereas technology backstopping through KVKs and advisory services through postmaster were less important strength in comparison to others. This can be supported by B.T. Hanyani-Mlambo (2002) study on Master Farmer Training Schemes in Zimbabwe spreading modern, scientific farming techniques in communal areas by the competent master farmer. Master farmer certificates and badges were awarded to communal farmers who adopted and practiced improved methods. This extension approach was based on the “trickle-down” theory of extension, in which a few progressive farmers receive extension and information, which they are expected to pass on to other farmers through farmer-to-farmer dissemination and demonstration.

Table 1: Strength of IARI-Post Office Linkage Extension Model as perceived by stakeholders

(n=120)				
Description	Mean score	SD	CV	Final rank
Timely delivery of seeds	1.925	0.87	45.25	II
Branch postmaster as local extension agents	3.342	0.98	29.41	III
Cost effectiveness	3.50	0.87	24.84	IV
Reaching distant farmers	1.608	0.95	59.39	I
Advisory services through post master	5.392	0.87	16.18	VI
Technology backstopping through KVKs	5.217	0.85	16.33	V

Table 2: Multiple pairwise comparisons of strength of the model perceived by stakeholders using Nemenyi’s procedure / Two-tailed test

(n=120)			
Description	Sum of ranks	Mean of ranks	Groups
Reaching distant farmers	193.00	1.608	A
Timely delivery of seeds	231.00	1.925	A
Branch Post master as local extension agent	401.00	3.342	B
Cost effective	420.50	3.504	B
Technology backstopping through KVKs	626.50	5.221	C
Advisory services through postmaster	648.00	5.400	C

B) Limitation of the IARI-Post Office Linkage Extension Model as perceived by the farmers

All models or extension approach has its own strengths and limitations. The probable constraints faced by the farmers were kept in mind of the researcher at the time of schedule development. In the schedule, the constraints were

divided into 3 parts as constraints faced by farmers, constraints perceived by BPM, constraints perceived by KVK Scientists. Apart from the close-ended questions, some open-ended questions were also kept in the schedule to capture more constraints as perceived by the farmers. The limitations of the model which were collected from different stakeholders would help in problem identification and strengthen the model with suitable modification. Sulaiman critically analyzed the agricultural extension system in India, using innovation systems concept described the weaknesses in public- or private-sector extension programs and provided suggestions for strengthening the systems. (Sulaiman and Holt 2002; Sulaiman and Hall 2002; Sulaiman and van den Ban 2003).

The weakness analysis of any organization providing extension examine the underlying process and structures like scale and complexity, linkages, operational resources and sustainability, conceptual problems, human resource capacity, and creating learning environments etc. (Glendenning *et al.*, 2010).

a) Constraints of the IARI-Post Office Linkage Extension Model as perceived by farmers

The respondents (beneficiary farmers) were asked to rank constraints what they perceived in the model. Ranking from 1 to 5 scores according to severity among five constraints was made by respondents and mean rank scores were calculated. The major constraint perceived by farmers was “selection criteria of beneficiary not clear to farmers” (Mean=2.76, 2.3) (Table 3). The farmers of both the district were not aware of the selection process of beneficiaries each year which was creating chaotic situation before cropping season. Improper information about seed availability was second severe constraint (Mean=2.78) in Sitapur due to the low rate of assurance about seeds availability to different sectors of farmers by branch postmaster. In Buxar, unlike Sitapur “biasness of branch postmaster in the selection of beneficiaries” was a second important limitation (Mean=2.4) as perceived by the farmers. The previous study by Burman *et al.*, (2015) warned the probable threat in their SWOT analysis “Nepotism shown by postal staff in distributing seed among the farmers” became 2nd and 3rd severe constraint in Buxar and Sitapur respectively. The BPM used to select beneficiaries who were in contact with him on regular basis. Some beneficiaries were regularly contacted who received seeds regularly as well, but others faced irregularity in receiving inputs. The other reason might be the less quantity of new seeds was dispersed in some patches of the village. Information gap on adoption of technology was least important constraints as there were good informal

networks among BPM, progressive farmers and fellow farmers in the community which facilitated information communication. The regular training and demonstration regarding improved technologies on the BPM and progressive farmer’s field might facilitate information transfer on adoption practices. The stakeholder’s analysis confirmed that regular despatch of seeds from IARI to KVK and BPOs with the certain quantity which supported the findings as “irregularities in seed delivery” was least severe constraints perceived by the farmers. In case of Buxar, although Pusa Sugandh-5 was high yielding and scented variety which was appealing to the farmers, there was a problem of milling and marketing of rice. This was supported by previous findings how one innovative approach namely Master Farmers Training Scheme where progressive farmers act as Master farmer facilitated high adoption rate of very visible innovations such as hybrid maize (Hemmes and Vissers, 1988). However, the programme failed to produce notable yield increases in many African crops because the marketing of surplus crops was difficult.

Table 3: Constraints of the IARI-Post Office Linkage Extension Model as perceived by the beneficiary farmers

Constraints	Mean score (Sitapur, n=70)	Mean score (Buxar, n=30)
Biasness of branch postmaster in the selection of beneficiaries	2.92	2.40
Improper information on seed availability	2.78	3.00
Irregularity in seed availability	3.05	2.53
Selection criteria of beneficiary not clear to farmers	2.76	2.30
Information gap in adoption of technology	3.35	4.70

There was an attempt to elucidate the relationships among the constraints which distinguished the constraints into different groups. Friedman test and multiple pairwise comparisons test were used to analyze and categorize the constraints in a group with the severity of ranking. There was no significant difference among the constraints as all the constraints fell into one category (Table 4). It might be the strength of each constraint is not significantly different from another constraint which explained the overall perception of beneficiary farmers was similarly distributed in each constraint in Sitapur. The Friedman test was showing the same insignificant relationship among the constraints by *p*-value 0.155 (Table 6). So, the remedies strategies for constraints should be focused on each constraint with equal importance. In Buxar, one constraint i.e. information gap on adoption of technology solely occupied one group which was showing different as least important constraint than others (Table 5). These grouping narrated that the two groups were significantly different by *p*-value 0.001 (Table 6). Hence, the remedies strategies

should put more focus on important constraints rather than least one.

Table 4: Multiple pairwise comparisons of constraints of the model perceived by Sitapur beneficiaries using Nemenyi's procedure

(n=70)			
Description	Sum of ranks	Mean of ranks	Groups
Selection criteria of beneficiary not clear to farmers	195	2.8	A
Improper information on seed availability	196	2.8	A
Biasness of Branch postmaster in the selection of beneficiaries	207	2.95	A
Irregularity in seed availability	215.5	3.07	A
Information gap on adoption of technology	236.5	3.37	A

Table 5: Multiple pairwise comparisons of constraints of the model perceived by Buxar beneficiaries using Nemenyi's procedure / Two-tailed test

(n=30)			
Description	Sum of ranks	Mean of ranks	Groups
Selection criteria not clear to farmers	69	2.30	A
Biasness of Branch postmaster in selection of beneficiaries	72	2.40	A
Irregularity in seed availability	76.5	2.55	A
Improper information on seed availability	90.5	3.01	A
Information gap in adoption of technology	142	4.73	B

Table 6: Friedman test statistics of constraints of the model as perceived by beneficiaries

Friedman test	Sitapur(n=70)	Buxar(n=30)
Q observed value	6.657	48.849
Q critical value	9.488	9.488
DF	4	4
P-value (two tailed)	0.155	< 0.0001
Alpha	0.05	0.05

b) Constraints of the IARI-Post Office Linkage Extension Model as perceived by Branch Post Masters (BPMs)

BPMs were part of this model as both farmers and change agents. Hence the constraints perceived by BPMs were crucial for the model. From Table 7 it could be observed that the highest rank for constraints given by BPMs was "lack of incentive" (Mean=1.7) followed by "inability to satisfy farmers' demand" (Mean=2.7) and "difficulty in farmer's selection" (Mean=2.9). The similar finding as "low incentive to village post master" was perceived weakness found in Burman *et al.*, (2015) study became true in recent studies. The researcher tried to discuss those issues with BPMs why they felt as constraints. Although they are farmers they would be motivated to do extra work as para-extension personnel in the model if there would be any incentive. As the quantity

of seed was fixed, it was difficult for them to satisfy farmers demand. As most of the BPMs were local farmers they could handle the problems of farmers easily. Information on seed availability was almost severe constraint because of instant updating from ICAR-IARI at the time of dispatch of inputs through the post office. Hence there was a clear-cut difference between two groups "A" and "B" which can be considered into modification strategies in the model to satisfy BPMs emphasizing on "A" group in urgent basis. The Friedman test showed the significant difference among the constraints with p-value 0.011. (Table 8)

Table 7: Multiple pairwise comparison tests for constraints of the model as perceived by BPMs

(n=10)		
Constraints	Mean of rank	Group
Lack of incentive	1.7	A
Unable to satisfy farmers demand	2.7	A
Difficulty in farmers selection	2.9	A
Difficulty in handling operational problems of farmers	3.7	B
Information gap regarding seed availability	4.0	B

Table 8: Friedman test statistics of constraints of the model as perceived by BPMs

Friedman test	
Q observed value	13.120
Q critical value	9.488
DF	4
P-value (two tailed)	0.011
Alpha	0.05

c) Constraints of the IARI-Post Office Linkage Extension Model as perceived by KVK scientists

From focus group discussion and personal interviews, there were some constraints found being faced by KVK scientists were financial constraint regarding low operational and recurring cost for field visit and training and less command area for demonstration and seed production of variety. Still, they were able to manage by clubbing the events together and inviting beneficiaries when they were organizing FLD, OFT, and training as mandated activities of KVK. So it is evident that there can be some facilitation of financial provision and logistic support could accelerate the extension service in the intervention areas.

Suggestion to overcome constraints in FGD with stakeholders

The strength and limitations are two sides of a single coin. So, there is a need to analyze strength and limitation for future perspectives and to overcome those with proper strategies. Suggestions are always welcome from the

stakeholders to revamp the system with suitable modification in several levels. Certain suggestions explained for the public-sector extension system were reform by replacement with a new organization, piloting different models for learning and capacity development, and learning from positive deviants and worldwide experiences in innovations in extension (Sulaiman and Hall, 2008). These suggestions are quite relevant in reviving the agricultural extension system. Here, the researcher tried to find some strategies to overcome the constraints for further improvement with the help of the result of focused group discussion with stakeholders. These strategies are proper monitoring and dispatching seeds in farmer's name which should be scrutinized in *Gram Sabha*. Distribution of seeds with signature and mobile number of farmers by proper register was another suggestion. Another strategy is to involve mass media to increase awareness of people regarding the model. The use of ICT could accelerate the model strength overcoming weakness by the mobile-based delivery status of inputs from the institute to the stakeholders. The time of despatch, duration of transport of commodity, the varietal specification details could be customised into mobile based on different locations and can be shared with the respective stakeholders. The updated technologies should be tested and verified in KVK and postmaster field in the first trial before disseminating to the farmers level for visualizing the future result by fellow farmers. The Sensitization of BPM and progressive farmers was also required through regular training in the Post Office premises by KVK Staff.

C) Strategies for out-scaling of IARI-Post Office Linkage Extension Model

Suggestions to out-scale the technologies through replication of the model was critically recorded and analyzed through focused group discussion. It was suggested by many respondents that besides IARI, other ICAR institutes may use this technology dissemination model according to the suitability of location. KVKs can identify BPMs in the districts and prepare them as community-based change agents through capacity building. Other nearby institutes like IIPR Kanpur, IISR Lucknow, CISH Lucknow, NDUAT Faizabad, CSAUA&T, Kanpur could use a similar mechanism to disseminate their technologies in *Sitapur* or similar locations. There is an ample scope of dissemination of location-specific crop and varieties like pulses, sugarcane, sub-tropical fruits from the central institutes namely IIPR, IISR, CISH, respectively through KVK- Post Office as a service partner. This helps in up-scaling the model enriched with new crops and varieties like pulse, sugarcane, and sub-tropical fruits. The

other potential inputs like micro-nutrient (Zinc, Sulfur, Iron etc.), Pusa hydrogel, bio-fertilizer etc. were disseminated through the model and some technologies are in pipeline to be involved for upscaling of the model. The state universities nearby Sitapur can replicate the parallel mechanism for strengthening regional agro-climatic based research-extension support to the local farmers. In case of Bihar, ICAR Research Complex for Eastern Region, Patna would accelerate the Change agent-Client linkage through two-way communication in Institute-Post office linkage model. The several technologies can be demonstrated on the Postmaster and progressive farmer's field which can earn trust and confidence of farmers on technologies. The crop-specific institutes like NRC on Litchi, Muzaffarpur can take this model to reach the Litchi farmers conveniently with suitable demand-driven technologies. Institute of Farming System may also be involved for further replication of the model in similar areas.

CONCLUSION

ICAR with more than hundred research institutes, directorates, project directorates, NRCs, AICRPs etc. are situated in the respective crop location based on specific agro-climatic region. For instance, the NRRI, DRR for rice crop are situated in Cuttack (Odisha) and Hyderabad (Telangana-Andhra Pradesh) respectively as these two states and neighboring states are rice belt area. So it is the virtue of our institutes and their coverage area which is not so far either within states or nearby states can be covered through post office with low transport cost. This can further lower the cost of cultivation of farmer through this model due to lower postal transaction cost. This location-specific model mechanism can be adapted by the several research institutes for outreaching the technologies developed in the research institutes to nearby and distant farmers.

REFERENCES

- Anderson, J. R. 2007. *Agricultural advisory services*. Background paper for *World Development Report 2008*, Agriculture for Development. Washington, DC: The World Bank.
- Anderson, J. R. and Feder, G. 2007. Agricultural extension. *Handbook of agricultural economics*, 3, 2343-2378.
- Anonymous 2017. *Marion Simon, Ph.D., State Specialist for Small Farm and Part-Time Farmers* Kentucky State University Cooperative Extension Program. Accessed from <http://articles.extension.org/pages/64541/how-to-do-a-strengths-weaknesses-opportunities-and-threats-swot-analysis> on 10.11.2017

- Birner R, Davis K, Pender J, Nkonya E, Anandayasekeram P, Ekboir J, Mbabu A, Spielman D, Horna D, Benin S, Cohn M. 2006. From “best practice” to “best fit”: A framework for analyzing pluralistic agricultural advisory services worldwide, DSGD Discussion Paper 37, International Food Policy Research Institute.
- B.T. Hanyani-Mlambo 2002. Strengthening the pluralistic agricultural extension system: a Zimbabwean case study, Agricultural Research Council (ARC) Zimbabwe <http://ftp.fao.org/docrep/fao/005/AC913E/AC913E00.pdf>
- Burman, R. R., Sarkar, S., Sangeetha, V., Dubey, S. K., Sharma, J. P., Singh, I., & Gupta, H. S. 2015. Critical Analysis of IARI-Post Office Linkage Extension Model: An Innovative Extension Approach to Reach the Unreached. *Indian Research Journal of Extension Education*, 15(1), 12-19.
- Davis, K. 2008. Extension in sub-Saharan Africa: Overview and assessment of past and current models and future prospects. *Journal of International Agricultural and Extension Education*, 15(3), 15-28.
- Glendenning, C. J., Babu, S., & Asenso-Okyere, K. 2010. Review of Agricultural Extension in India. *Are farmers information needs being met*.
- Hemmes, C. & Vissers, M. 1988. Agricultural extension in Zimbabwe. Wageningen, the Netherlands, Wageningen Agricultural University. (unpublished report)
- Meena, M. S., Singh, K. M., & Swanson, B. E. 2015. Indian Agricultural Extension Systems and Lessons Learnt: A Review.
- Nyamupangedengu, Z. S., & Terblanche, S. E. 2016. Weak and or non-existent farmer-research-extension linkage structures, a cause for concern: the Nyanga District perspective, Zimbabwe. *South African Journal of Agricultural Extension*, 44(2), 110-120.
- Sulaiman, R., and A. Hall. 2002. Beyond technology dissemination: Can Indian agricultural extension re-invent itself? ICAR Policy Brief 16. New Delhi: Indian Council of Agricultural Research.
- Sulaiman, R., and A. Hall. 2008. The fallacy of universal solutions in extension: Is ATMA the new T&V? . Accessed November 4, 2017.
- Sulaiman, R., and A.W. van den Ban. 2003. Funding and delivering agricultural extension in India. *Journal of International Agricultural and Extension Education*, 10(1), 21–30.
- Sulaiman, R., and G. Holt. 2002. Extension, poverty and vulnerability in India: Country study for the Neuchatel Initiative. Working Paper 154. London: Overseas Development Institute.