Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.2883

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **5 (5):** 1512-1520 (2017)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Relationship of Dyadic Variables with the Linkage Effectiveness of the Research-Extension-Farmer Linkages under Extension Reform Programme (ATMA) in Assam

K. P. Biam[1*], U. Barman[2] and D. K. Gogoi[3]

[1]PhD Scholar, [2] Associate Prof. Dept. of Extension Education, College of Agriculture, Assam Agricultural University, Jorhat, 3. Prof. Dept. of Extension Education, College of Agriculture, Assam Agricultural University, Jorhat

*Corresponding Author E-mail: kamnipaia@gmail.com

Received: 21.04.2017 | Revised: 29.05.2017 | Accepted: 4.06.2017

ABSTRACT

In agricultural systems, research- extension- farmer linkages play a substantial role as they represent the connection between major components. The purpose of this paper was to find out the relationship between the level of linkage effectiveness and the dyadic variable at system level in the Research-Extension-Farmer linkages under the extension reform programme Agricultural Technology Management Agency (ATMA). The study was conducted in Jorhat and Golaghat districts of Assam. Multistage purposive cum random sampling was used to collect data from 134 respondents. The research tool included a questionnaire and personal interview. The relationship was assessed for three linkages at the block level ATMA. In the study Krishi Vigyan Kendra (KVK) was considered as a unit of research and Block Level ATMA was considered as the extension system. To find out the effectiveness of the KVK- Block Level ATMA- Farmer linkage at the block level, a linkage effectiveness score for the three linkages between Block Level ATMA- KVK, Block Level ATMA- Farmer and KVK- Farmer was calculated and expressed in percentage. The relationship between the dyadic variables and linkage effectiveness was analysed using Spearman Rank Order Coefficient of Correlation.

Key words: *Effectiveness, Dyad, Linkage, KVK, Block Level ATMA, Farmers.*

INTRODUCTION

Agriculture Extension system plays a crucial role in disseminating improved agricultural technology to increase production as well as productivity in agriculture and allied sectors. Over the years, the extension system in India has evolved with numbers of programmes and projects being introduced with the Agricultural Technology Management Agency (ATMA) model being one of them. ATMA is a registered society of key stakeholders involved in agricultural activities for sustainable agricultural development in the district to ensure delivery of extension services to farmers.

Cite this article: Biam, K.P., Barman, U. and Gogoi, D.K., Relationship of Dyadic Variables with the Linkage Effectiveness of the Research-Extension-Farmer Linkages under Extension Reform Programme (ATMA) in Assam, *Int. J. Pure App. Biosci.* **5(5):** 1512-1520 (2017). doi: http://dx.doi.org/10.18782/2320-7051.2883

ATMA an autonomous institution at the district level is a focal point for integrating Research and Extension activities and decentralizing day-to-day management of Agricultural Extension System[2].

Working Group on Agricultural Extension under Planning Commission[5] pointed out that various components of public sector extension system suffered from duplication of programs without convergence. While ATMA is pushed as platform through which the multiple agencies can converge, the implementation difficulties are proving too big for effective integration, with shortage of both fund and personnel. The major bottlenecks in implementation of agricultural development programmes were non availability of quality inputs like seed, pesticides, fertilizer; weak linkages between different line departments at block level, lack of transport facilities for remote area, lack of training to farmers, lack of financial resources and lack of convergence.

Munyua *et al.*[3] stated that the research-extension-farmer relationship should be viewed as an interdependent and inter-related continuum. Altaye[1] cited the importance of a responsible body that can manage linkages that fosters successful research-extension-farmers' linkages with well formulated, properly defined and institutionalized linkage strategies and mechanism. More precisely, interdependence among the researchers, extension workers, and farmers prevents isolation, which impedes technology transfer. Close bonding among the three key players also promotes development of relevant technologies that provide directly measurable results or perceived benefits to the target population and adapted to local conditions. Macklin[4] observed that though extension has to maintain effective linkages with several systems, only the Research-Extension linkages quality and capabilities of has been so far emphasized in India. However, several measures to improve this linkage, though adopted, did not yield positive results and information flow had been mostly top-down. The agricultural extension system is a complex system each sub-systems playing different roles; the linkages and relationship among each other become more important particularly because farmers have to be the prime beneficiaries for development of the individual and farming community as a whole. Under the ATMA programme the three actors namely research, extension and farmers are linked through various activities at the block and village level. However, linkages among the various subsystems require them to feel the need to maintain a relationship among themselves. The dyad relationship i.e. a relationship between two sub-systems will vary based on the need and interdependence of one another to maintain linkages. It is in this context the present study was taken up with the following objectives to study the relationship of the selected dyadic variables with the effectiveness of the linkages at the block level.

MATERIALS AND METHODS

ATMA is being implemented in Assam since 2005. There are two types of ATMA in the state sponsored by World Bank and Centrally Sponsored Scheme (CSS) of Government of India. The CSS-ATMA scheme is implemented in 14 districts and 12 districts are covered by the World Bank. A multistage sampling design was followed in the study. One district from each set of ATMA was selected purposively. These were Jorhat district form World Bank funded-ATMA and Golaghat district from CSS-ATMA.

(A) Selection of Scientists from Krishi Vigyan Kendras

The head of the KVK, designated as Programme Coordinator (PC), was selected purposively since PC is a member of the ATMA Governing Board (GB). In one KVK, there are six Subject Matter Specialist (SMS). Out of these, one designated KVK scientist who is specifically assigned to carry out ATMA activities was selected purposively. Besides these two respondents, two more SMSs were randomly selected from each KVK for the study. So from each district four KVK scientists were selected making a total of eight KVK scientists from two districts as

respondents under research component of ATMA.

(B) Selection of Block Technology Team Members

For selection of Block Technology Team (BTT) members from each selected Development Block first common disciplines were identified to which BTT members were assigned to work. Four disciplines such as agriculture, veterinary, sericulture and fishery were identified for the study. One BTT member from each selected discipline and the Block Level ATMA convener was selected for the study. However in two blocks of Jorhat district there was no BTT member in sericulture. Here, BTT member (Sericulture) was replaced by an additional BTT member (Agriculture). Thus, 15 BTT members were selected from each district making the total respondents 30 under extension component of ATMA.

(C) Selection of farmers

The farmer respondents were selected from the Block Farmer Advisory Committee (BFAC) members, farmers' group and Farmer Friend. The BFAC comprises of 12 farmers who are the farmers' representatives of various Commodity Interest Groups (CIGs) and Farmers Interest Groups (FIGs). The BFAC members comprised of farmers of various disciplines. For the study, nine BFAC members from the selected disciplines were selected based on numbers of members from each discipline. Thus three agriculture farmers, two horticulture farmers, two fishery farmers and two veterinary farmers were purposively selected from each BFAC of the selected block. Additionally, two male and two female farmers' group members were randomly selected since ATMA is a group approach. Farmers Friend is a new concepts introduced in ATMA who is belonged to famers' community and has willingness to serve voluntarily for the benefits of farmers under ATMA. So, three Farmers' Friends from each block was also selected randomly. Thus 16 farmers were selected from each selected Development Block under ATMA and total 96 farmers were the respondents from the farmer subsystem.

Thus in the present study, eight KVK scientists, 30 Block Level ATMA members and 96 farmers were selected from three sub-systems. Thus, a total respondent for the study was 134.

In the present study, linkage effectiveness in the research, extension and farmer communication triangle at the block level ATMA is the extent to which one unit communicates and interacts with the other unit/s of the system to achieve desired cooperation and collaboration in the process of ensuring effective technology development, refinement and dissemination in agriculture. The linkage effectiveness is operationalised as the score estimated for inter-units linkage based on assessment of effectiveness by both the actors of a linkage on selected indicators related to the communication and interface activities.

The effectiveness was studied for three linkages(R-E-F) at the block level ATMA. In this study the linkages were as follows:

1. Block Level ATMA (E) – KVK (R) linkage
2. Block Level ATMA (E) – Farmer (F) linkage
3. KVK (R) – Farmer (F) linkage

To assess the linkage effectiveness certain indicators based on selected dimensions for each linkage under ATMA were used to calculate the linkage effectiveness status. Scores were assigned to each category of the dimensions and finally the overall score was calculated and expressed in percentage using a formula developed for the study. The selected indicators for Block level ATMA – KVK linkage were (i) linkage through a designated KVK scientist (three dimensions) and (ii) conducting joint field visits between Block level ATMA and KVK scientists (three dimensions).For Block level ATMA – farmer linkage, the indicators were (i) linkage through Block Farmer Advisory Committee members (4 dimensions), (ii) linkage through Farmer Friend (3 dimensions)and (iii) linkage through Farmer Groups (FIGs and CIGs) with two dimensions.

The selected effectiveness indicators for KVK and farmer linkage were (i) linkage through Farmer- Scientist interactions with five dimensions, (ii) linkage through Scientific Advisory Committee (SAC) with two dimensions and (iii) formal /informal linkages with three dimensions.

The linkage effectiveness score for each linkage was calculated using the following formula:

$$\textbf{Linkage effectiveness score} = \frac{\sum_{i=1}^{n} \text{Observed linkage score}}{\sum_{i=1}^{n} \text{Maximum possible linkage score}} \times 100$$

Observed linkage score (OLS) = (Sum of total score obtained by all the respondents for that dimension) X (Number of respondents for each dimension)

Maximum possible linkage score (MPLS) = (Sum of total highest possible score for each dimension) X (Number of respondents for that dimension)

To explain the variations in effectiveness of the three linkages across the sampled blocks a set of dyadic variables were selected. The dyadic variables (one set of variables for two person) are treated as independent variables. For the study four dyadic variables were used for relationship analysis between Block Level ATMA- KVK-Farmer linkage and level of linkage effectiveness. To find out the relationship between the dependent and the dyadic variables at system level, Spearman Rank Order Coefficient of Correlation was used.

RESULTS AND DISCUSSION

1. Profile of the respondents

(A) Block Technology Team (BTT) members: Table 1 depicts that two third of the BTT members (66.66%) belonged to the age group between 42-51 years, with a mean of 47.07 years. Almost all the BTT members (96.67%) were graduates.

(B) KVK scientists: Regarding age, a majority of the KVK scientists (71.43%) belonged to the age group below 36 years, with a mean of 41.29 years which can be seen in Table 2. The educational qualification of all the KVK scientists were Post Graduates (100.00%)

(C) Farmers: Table 3 depicts that majority of the farmers (65.62%) belonged to the age group between 36-51 with a mean of 43.56 year. Majority of the farmers (29.17%) had higher secondary level educational qualification.

Table 1: Distribution of Block Technology Team members according to their personal characteristics

n=30

Sl No.	Characteristics	Range	Frequency	Mean	SD
1.	Age				
		Below 42 yrs.	5(16.67)	47.07	4.70
		42-51 yrs.	20(66.66)		
		Above 51 yrs.	5(16.67)		
2.	Education				
		Graduate	29(96.67)		
		Post graduate	1(3.33)		

Figures in parenthesis indicate percentage

Table 2: Distribution of KVK scientists according to their personal characteristics n=7

Sl No.	Characteristics	Range	Frequency	Mean	SD
1.	Age				
		Below 36 yrs.	5(71.43)		
		36-47 yrs.	2(28.57)	41.29	5.41
		Above 47 yrs.	0		
2.	Education				
		Graduate	0		
		Post graduate	7(100.00)		

Figures in parenthesis indicate percentage

Table 3: Distribution of farmers according to their personal characteristic n=96

Sl No	Characteristics	Range	Frequency	Mean	SD
1.	Age				
		Below 36 yrs.	14(14.59)		
		36-51 yrs.	63(65.62)	43.56	4.70
		Above 51 yrs.	19(19.79)		
2.	Education				
		No education	0		
		Up to primary school level	20(20.83)		
		Middle school level	18(18.75)		
		High school level	27(28.12)		
		Higher secondary level	28(29.17)		
		Graduation	3(3.13)		

Figures in parenthesis indicate percentage

2. Level of linkage effectiveness

i. Block Level ATMA (E) – KVK (R) linkage:

From Table 4 it can be observed that for the linkage between Block level ATMA and KVK the linkage effectiveness score in ATMA-Jorhat district was highest in Koliapani block (86.13%), and in the case of Golaghat district, Kathulguri block (90.37%) had the highest linkage effectiveness score. The KVK of the districts are situated in those Blocks which may facilitate better communication with each other than the Blocks situated at distance place. So the linkage effectiveness is more in these two cases than others. Table 4.4 shows that the linkage effectiveness mean score was 73.99 per cent in ATMA-Jorhat and 83.46 per cent ATMA-Golaghat. The‘t’ value calculated (2.95) was found to be larger than the table value at 0.05 level of probability. Hence, a significant difference was found between the linkage effectiveness mean score for the linkages between Block Level ATMA and KVK for ATMA-Jorhat and ATMA-Golaghat. This may be because under CSS-ATMA there was a provision for linkage i.e. monthly meetings of BFAC at the block where BFAC members, BTT members and deignated KVK scientist meet to discuss BAP (Block Action Plan) which is not the case in ATMA-Jorhat. Also, it may be due to the absence of a specific designated KVK scientist in ATMA-Jorhat, unlike ATMA-Golaghat that has and assigned designated KVK scientists to coordinate their activities.

Table 4: Linkage effectiveness score for the blocks of Jorhat and Golaghat district for the linkage between Block Level ATMA and KVK

Jorhat (n=18)			Golaghat (n=19)			't' value
Blocks	**Linkage effectiveness score (%)**	**Mean linkage effectiveness score**	**Blocks**	**Linkage effectiveness score (%)**	**Mean linkage effectiveness score**	
Baghchung	73.80		Sarupathar	77.78		
Koliapani	86.13	73.99	Kathalguri	90.37	83.46	2.95*
Titabor	62.06		Bokakhat	82.22		

*Significant at 0.05 level of probability n_1+n_2 -2=35 d.f.

ii. Block Level ATMA (E) – Farmer (F) linkage:

It can be observed from the Table 5 that the linkage effectiveness score for the linkage between Block Level ATMA and Farmer in ATMA-Jorhat district was highest in Koliapani block (92.80%) and in case of Golaghat district the highest score was observed in Kathulguri and Bokakhat blocks with equal linkage effectiveness scores (93.52%). A minor difference in scores is due under utilization of the potential of farmer friend by some BTT members for linkage maintenance. From Table 5 it is observed that the linkage effectiveness mean score was 91.36 per cent and 93.28 per cent in ATMA-Jorhat and ATMA-Golaghat respectively. The't' value calculated (0.75) was found to be smaller than the table value at 0.05 level of probability. Hence, no significant difference was found between the linkage effectiveness mean score for the linkage between Block Level ATMA and farmer for ATMA-Jorhat and ATMA-Golaghat. CSS-ATMA and World Bank funded ATMA had provisions and platform of interface which facilitated better linkage maintenance at the block level where BTT and BFAC representing extension functionaries and farmers functioned jointly and meet monthly to coordinate ATMA activities and prepare BAP for their respective blocks.

Table 5: Linkage effectiveness score for the blocks of Jorhat and Golaghat district for the linkage between Block Level ATMA and farmer

Jorhat (n=54)			Golaghat (n=54)			't' value
Blocks	**Linkage effectiveness score (%)**	**Mean linkage effectiveness score**	**Blocks**	**Linkage effectiveness score (%)**	**Mean linkage effectiveness score**	
Baghchung	90.65		Sarupathar	93.52		
Koliapani	92.80	91.36	Kathalguri	93.52	93.28	0.75
Titabor	90.65		Bokakhat	92.80		

n_1+n_2 -2=106 d.f.

iii. KVK (R)-Farmer (F) linkage:

The findings in Table 6 reveals that for the linkage between KVK and farmer the linkage effectiveness score in ATMA-Jorhat district was highest in Koliapani block (82.50%) and in case of Golaghat district Kathulguri block (91.48%). It is observed that in Table 6, the linkage effectiveness mean score was 59.75 per cent and 74.94 per cent in ATMA-Jorhat and ATMA-Golaghat respectively. The 't' value calculated (2.52) was found to be larger than the table value at

0.05 level of probability. Hence, a significant difference was found between the linkage effectiveness mean score for the linkage between KVK and farmer for ATMA-Jorhat and ATMA-Golaghat. The KVK-Golaghat area of operation included all the development blocks of the district which facilitated better linkages opportunities unlike KVK-ATMA.

Table 6: Linkage effectiveness score for the blocks of Jorhat and Golaghat district for the linkage between KVK and farmer

Jorhat (n=42)			Golaghat (n=43)			't' value
Blocks	**Linkage effectiveness score (%)**	**Mean linkage effectiveness score**	**Blocks**	**Linkage effectiveness score (%)**	**Mean linkage effectiveness score**	
Baghchung	58.00		Sarupathar	66.37		
Koliapani	82.50	59.75	Kathalguri	91.48	74.94	2.52*
Titabor	38.75		Bokakhat	66.98		

*Significant at 0.05 level of probability n_1+n_2 -2=83 d.f.

3. Relationship of the selected dyadic variables with the level of linkage effectiveness

For relationship study the dyad mean score for each dyadic variable was computed for the three linkages and was correlated with the linkage effectiveness score of each block to test for any significant relationship with the level of linkage effectiveness. The analysis was done at system level using Spearman Rank Order Coefficient of Correlation. The finding in Table 7, 8 and 9 reveals the dyad mean score for the dyadic variables of the respective blocks of both the districts for the linkage between Block Level ATMA- KVK, Block Level ATMA-Farmers and KVK and Farmers.

Table 7: Dyad mean score of BTT members and KVK scientists for the linkage between Block Level ATMA and KVK

Sl. No.	Dyadic variable	Score range	Dyad mean score					
			Baghchung	Koliapani	Titabor	Sarupathar	Kathalguri	Bokakhat
1.	Perceived need of interdependence	0-1	3	4	3.5	4	4.5	3.5
2.	Initiative for linkage maintenance	0-2	3.5	6.5	5.5	6.5	8	7.5
3.	Extent of involvement in each other activities	0-2	2.5	5.5	2.5	5.5	6.5	6
4.	Extent of formal and informal contacts	0-3	8.5	11.5	7.5	11	12.5	11.5

Table 8: Dyad mean score of BTT members and farmers for the linkage between Block Level ATMA and farmer

Sl. No.	Dyadic variable	Score range	Dyad mean score					
			Baghchung	Koliapani	Titabor	Sarupathar	Kathalguri	Bokakhat
1.	Perceived need of interdependence	0-1	9	8.5	7.5	7.5	9	7.5
2.	Extent of formal and informal contacts	0-3	24	26	25	24	26.5	24

Table 9: Dyad mean score of KVK scientists and farmers for the linkage between KVK and farmer

Sl. No.	Dyadic variable	Score range	Dyad mean score					
			Baghchung	Koliapani	Titabor	Sarupathar	Kathalguri	Bokakhat
1.	Perceived need of interdependence	0-1	9	8.5	7.5	7.5	9	7.5
2.	Extent of formal and informal contacts	0-3	24	26	25	24	26.5	24

i. Relationship of dyadic variables with the level of linkage effectiveness of the linkage between Block Level ATMA and KVK

It is observed in Table 10 that the perceived need of interdependence (ρ=0.971), initiative for linkage maintenance (ρ=0.841) and extent of involvement in each other activities (ρ=0.829) were found to have a significant relationship with level of linkage effectiveness between Block Level ATMA and KVK linkage. This indicates that for effective dissemination of any new knowledge, technology and skill to the farmers in particular, the Block Level ATMA members and KVK scientist perceives that collaboration, cooperation, need and involvement in each other extension activities with his counterpart were a pre- requisite.

Table 10: Relationship of dyadic variables with the level of linkage effectiveness of the linkage between Block Level ATMA and KVK (n=6)

Sl. No.	Variables	ρ-value
1.	Perceived need of interdependence	0.971*
2.	Initiative for linkage maintenance	0.841*
3.	Extent of involvement in each other activities	0.829*
4.	Extent of formal and informal contacts	0.667

*Significant at 0.05 level of probability

ii. Relationship of dyadic variables with the level of linkage effectiveness of the linkage between Block Level ATMA and Farmer

It can be observed from the Table 11 that the perceived need of interdependence (ρ=0.800) and extent of formal and informal contacts (ρ=0.837) have a significant relationship with the level of linkage effectiveness between Block Level ATMA and Farmer linkage.

Table 11: Relationship of dyadic variables with the level of linkage effectiveness of the linkage between Block Level ATMA and farmer (n=6)

Sl. No.	Variables	ρ-value
1.	Perceived need of interdependence	0.800*
2.	Extent of formal and informal contacts	0.837*

* Significant at 0.05 level of probability

iii. Relationship of dyadic variables with the level of linkage effectiveness of the linkage between KVK and Farmer

The findings presented in Table 12 indicates that the perceived need of interdependence (ρ=0.820) and extent of formal and informal contacts have a significant relationship (ρ=0.899) with the level of linkage effectiveness between KVK and farmer. This may be due to the reason that effective linkage is possible only if there is regular contact either formal or informal between the individual members of a dyad.

Table 12: Relationship of dyadic variables with the level of linkage effectiveness of the linkage between KVK and farmer (n=6)

Sl. No.	Variables	*ρ*-value
1.	Perceived need of interdependence	0.820*
2.	Extent of formal and informal contacts	0.899*

* Significant at 0.05 level of probability

CONCLUSION

It can be concluded from the study that ATMA-Golaghat had a better linkage effectiveness score than ATMA-Jorhat for all the three linkages between Block Level ATMA-KVK, Block Level ATMA-Farmer and KVK-Farmer at the block level. Hence, the linkage mechanism in ATMA-Jorhat needs to be strengthened for the upliftment and effective dissemination of technologies to the farmers. Similarly, for effective coordination and collaboration each member of the linkage in a dyad system should be willing to cooperate and voluntarily assist in the linkage interface between each subsystems in the communication triangle at the block level ATMA programmes.

REFERENCES

1. Altaye, Shimelis, Analysis of Research-Extension-Farmer Linkage in fingerillet technology development i delivery in Mecha district of Mahara region, Ethiopia, *Journal of Agril. Eco. And Dev*., **1(6):** 121-129 (2012).
2. Kaushik, S. and Verma, T., Intersystem functional linkages for effective management of rural energy programme. *Indian Journal of Extension Education* **37:** 1-6 (2001).
3. Munyua, C. N.; Adams, P. F. and Thomson, J. S., *Designing Effective Linkages for Sustainable Agricultural Extension Information Systems Among Developing Countries in Sub-Saharan Africa*, Proceedings of the 18th Annual Conference of the Association for International Agricultural and Extension Education, Durban, South Africa, pp. 301-307 (2002).
4. Macklin, M., Agricultural Extension in India, World Bank technical paper 190,World Bank, Washington, D.C. (1992).
5. Planning Commission, Recommendations of Working Group on Agricultural Extension for Formulation of Eleventh Five-Year Plan. Working Group Report, Planning Commission, Government of India: New Delhi (2007).