

A study on different AKIS actors on agricultural knowledge and information dissemination

ABSTRACT:

Agricultural Knowledge Information System (AKIS) is a network of actors in an innovation platform who complement one another and promote innovation. There are very few studies conducted on AKIS and it was a great challenge for the investigator to mobilize the officials to collect linkage information. Based on the issue, AKIS of Jalpaiguri District, West Bengal has been selected purposively to know the actors and their inter-linkage with respect to agricultural knowledge and information dissemination. Linkage strength measures the quantitative achievement of an actor on the total number of dimensions of linkage established in an AKIS, whether, linkage diversity lights on the qualitative expansion of linkage built by an actor over all other actors playing in that AKIS. The linkage diversity with an average value of 0.79 for the Jalpaiguri district reflects that the linkage network is substantially dense among the AKIS actors in the district, although the strength of linkage is rather weak with an average value of 0.15 for the district.

Keywords: AKIS, Actors, Linkage Diversity, Linkage Strength, Jalpaiguri

INTRODUCTION:

Agricultural Knowledge and Information Systems (AKIS) is a system that connects agricultural research, extension, and education (commonly known as the knowledge triangle) and focuses on how these three activities generate new knowledge and information for farmers. An AKIS as a network consists of various actors and multidimensional perspectives, including relationships, policies, knowledge sources, communication methods, knowledge creation, information sharing, and development decision-making [1]. The configuration of actors in the "theatre of innovation" determines the key components of the system, which include farmers, educators, researchers,

extensionists, local leaders, NGOs, the private sector, and many other actors who "gel into a synergistic system" depending on the situation [2]. The basic premise of AKIS is that research and extension should not be seen as separate institutions which must somehow be linked instead, a scientist working on different types of research and extension agents at all levels should be seen as participants in a single Agricultural Knowledge Information System. It is a collection of agricultural organisations and/or individuals, as well as the links and interactions between them, that are involved in processes such as knowledge and information generation, transformation, transmission, storage, retrieval, integration, diffusion, and utilisation, and that work together to support decision making, problem-solving, and innovation in a given country's agriculture. These links and relationships facilitate the exchange of information between different bands of actors and help in the translation of research findings into farming practices [3]. Many developing countries are confronted with the issues of the poor working relationship between national agricultural research and extension organizations, and also with different categories of farmers and farm organizations. By understanding farmers' access and use of agricultural information, their linkages and actor matrix has the capacity to better target farmers [4, 5]. During the past few decades, the role of extension services, technology, and information transfer processes has been eventually evaluated in support of agriculture sector development. However, extension policies and approaches have not footsteps with these transitions of technology transfer approaches [6]. Social network actors' linkages to information have a significant impact on how quickly ideas spread from one person to the next, accelerating the adoption process. The ineffective transfer and uptake of technology by rural farmers in emerging nations was caused by poor information links. In relation to the influence of social network information links on technology adoption, the study sought to investigate the effect of social networks on the process of sharing agricultural knowledge as a substitute for conventional extension methods[7]. Different institutions play vital roles to achieve prosperity for the farmers with overall agricultural development in their area of operation by linkage with other actors or institutions. On this backdrop, present study was undertaken to the actors and their Inter-linkage with respect to Agricultural Knowledge and Information dissemination.

METHODOLOGY

The study was undertaken in the Jalpaiguri district of West Bengal from 2017 to 2023. Politically it has 9 blocks. Among these 9 blocks, the present study undertook 3 blocks (Jalpaiguri sadar, Maynaguri&Dhupguri blocks) randomly and selected all the institutional sources responsible for the generation and dissemination of agricultural knowledge and information in the block. The linkage of an organization with different other organizations was measured on five dimensions as (i) Policy and administrative dimension, (ii) Research dimension (technology generation and backstopping), (iii) Extension dimension (technology dissemination through training and demonstration), (iv) Resource dimension (manpower sharing and fund sharing) and (v) Service dimension (product marketing, consultancy, etc.) [8, 9]. The different types of organizations taken for the study were public organisations like Krishi Vigyan Kendra, line departments, (agriculture, animal resource department, fishery, horticulture, soil conservation, etc.), Agricultural Technology Management Agencies, banks, etc; private organisations like input dealers, corporate sectors; NGOs, Farmers' producer organizations and Farmers clubs.

The quantity and quality of linkage among the actors were assessed through two different constructs namely, Linkage Strength and Linkage Diversity. Linkage strength was calculated for each actor as:

$$\text{Linkage strength} = \frac{\text{Sum total of linkage scores obtained by an actor over all the other actors}}{K.S},$$

Where, K = Total number of actors playing in the AKIS, and

S = Maximum linkage score obtainable from any actor

The linkage was measured with a 6-point scale through no linkage (0), the linkage on one dimension (1), and so on up to linkage on all five dimensions (5).

Linkage diversity was calculated using Herfindal Diversity Index (HDI) as:

$HDI = 1 - \sum p_i^2$, where, $p_i = \frac{n}{N}$, and n is the linkage score obtained by the actor with i th actor, and N is the total number of linkage scores obtained by the actor over all other actors.

Linkage strength measures the quantitative achievement of an actor on the total number of dimensions of linkage established in an AKIS, whether, linkage diversity lights on the qualitative expansion of linkage built by an actor over all other actors playing in that AKIS.

RESULTS AND DISCUSSIONS

In the Jalpaiguri district, agricultural knowledge and information network consists of public, private, non-Government, autonomous, and farmernetworks as actors of AKIS. Table-1 presents the AKIS actors and their services in agricultural knowledge and information network.

Table 1: AKIS services undertaken by different actors of AKIS in Jalpaiguri district.

| AKIS actors | AKIS services undertaken (Superscript indicates Block under study) | <u>Key for AKIS services</u> A=Input supply; B=Output marketing; C=Market information; D=Loans and other forms of credit; E=Providing subsidy; F=Technology backstop; G=Training for knowledge development; H=Training for production skill development; I=Training for business skill development; J= Providing educational services; K=Providing welfare services; L= Facilitate access to development institution for different services; M= Implementing govt. development schemes; N=Providing weather, climate and ecological services. 1=Jalpaiguri Sadar block 2=Maynaguri block 3=Dhupguri block |
|--|--|--|
| 1. Krishi Vigyan Kendra | ACFGHIJKMN ^{1,2,3} | |
| 2. Agriculture department | ACEFGHJKM ^{1,2,3} | |
| 3. Horticulture department | AEFGMN ^{1,2,3} | |
| 4. Animal Resource department | AFGHIM ^{1,2,3} | |
| 5. Fishery department | ACDEFGHM ^{1,2,3} | |
| 6. Soil Conservation department | GHM ^{1,2,3} | |
| 7. Agricultural Technology Management Agency | ACEFGHM ^{1,2,3} | |
| 8. Farmers Club | ABCHM ^{1,2,3} | |
| 9. Farmer Producer Organization | ABCHM ^{1,2,3} | |
| 10. Farmer's Cooperative | AGKM ^{1,2,3} | |
| 11. Private Company | A ^{1,2,3} | |
| 12. Input Dealer | A ^{1,2,3} | |
| 13. NABARD | DEFGHILM ^{1,2,3} | |
| 14. Nationalized Bank | DM ^{1,2,3} | |
| 15. Microfinance Institute | DM ^{1,2,3} | |

It is evident from Table-1 that among different actors Krishi Vigyan Kendra, Agriculture department, Fishery department, NABARD, and Agricultural Technology Management Agency are undertaking the highest numbers of AKIS services in the AKIS of Jalpaiguri district followed by the Horticulture department, Animal Resource Department, Farmers Club, Farmer Producer

Organization, Farmers Cooperative, Soil Conservation department, Nationalized Bank, Microfinance institute, Private company, and Input Dealer are providing limited numbers of services. It is also observed that all of the actors provide comparable kinds of services in all of the studied blocks of the Jalpaiguri districts. It may be argued that Jalpaiguri is uniform in its access to the services of AKIS actors based on their function. It is also revealed that all of the actors provide similar types of services in all of the studied blocks of the Jalpaiguri districts. It can be argued that Jalpaiguri districts is consistent in their access to the services of AKIS actors based on their role.

Table 2: Inter-Linkage among AKIS actors in Jalpaiguri district.

| AKIS Actors | Linkage Diversity (Densest=1, Thinnest=0) | | | Linkage Strength (Strongest=1, Weakest=0) | | |
|--|--|-------------|-------------|--|-------------|-------------|
| | Jalpaiguri sadar | Maynaguri | Dhupguri | Jalpaiguri sadar | Maynaguri | Dhupguri |
| 1. Krishi Vigyan Kendra | 0.91 | 0.91 | 0.92 | 0.38 | 0.34 | 0.39 |
| 2. Agriculture department | 0.90 | 0.89 | 0.89 | 0.29 | 0.26 | 0.26 |
| 3. Horticulture department | 0.82 | 0.82 | 0.82 | 0.16 | 0.13 | 0.13 |
| 4. Animal Resource department | 0.74 | 0.74 | 0.74 | 0.09 | 0.09 | 0.09 |
| 5. Fishery department | 0.74 | 0.84 | 0.81 | 0.09 | 0.18 | 0.15 |
| 6. Soil Conservation department | 0.78 | 0.78 | 0.78 | 0.13 | 0.13 | 0.13 |
| 7. Agricultural Technology Management Agency | 0.88 | 0.86 | 0.81 | 0.25 | 0.24 | 0.17 |
| 8. Farmers Club | 0.88 | 0.88 | 0.86 | 0.29 | 0.28 | 0.25 |
| 9. Farmer Producer Organization | 0.88 | 0.88 | 0.88 | 0.29 | 0.28 | 0.28 |
| 10. Farmer's Cooperative | 0.80 | 0.80 | 0.67 | 0.05 | 0.05 | 0.03 |
| 11. Private Company | 0.86 | 0.86 | 0.86 | 0.07 | 0.07 | 0.07 |
| 12. Input Dealer | 0.75 | 0.67 | 0.75 | 0.04 | 0.03 | 0.04 |
| 13. NABARD | 0.84 | 0.84 | 0.84 | 0.11 | 0.11 | 0.11 |
| 14. Nationalized Bank | 0.63 | 0.63 | 0.63 | 0.04 | 0.04 | 0.04 |
| 15. Microfinance Institute | 0.50 | 0.50 | 0.50 | 0.02 | 0.02 | 0.02 |
| Average Value | 0.79 | 0.79 | 0.78 | 0.16 | 0.15 | 0.14 |
| <i>Statistical Implication (Kruskal Wallis Test)</i> | $H=0.151 (p=.927)$ | | | $H=0.071 (p=.965)$ | | |

Table-2 represents the quality and quantity of linkage among the actors of AKIS in the Jalpaiguri district of West Bengal. It is found from the table that in both linkage diversity and linkage strength, *Krishi Vigyan Kendra* (KVK) achieved the highest position among all other actors. *Krishi Vigyan Kendra* is a district-level institute that serves as a knowledge and information resource centre to promote agricultural and rural development. KVK's activity is

disseminated across the districts, and it builds links with all other actors in an AKIS on convergence mode. The agriculture department, Farmers club and Farmer Producer Organization, Agricultural Technology Management Agency (ATMA), and Horticulture department are the agricultural and rural development and similar way as a KVK act. The value of both linkage diversity and strength of *Krishi Vigyan Kendra*, Farmers club, FC and FPO reflects this fact. The line departments (Agriculture, ATMA, and Horticulture) also contributed significantly to agricultural knowledge and information dissemination. In an era of pluralistic extension, all service providers are somehow interconnected with one another to deliver agricultural services to end users. Such interrelated networks will increase performance [10] which may stimulate increased agricultural productivity [11].

The average values of linkage diversity of all the AKISs in different study blocks spell out that the quality of inter-linkage among the AKIS actors is on the upper side, whereas, the strength is on the lower side, which supports the findings of [9, 12]. With this observation, it can be said that the inter-linkage network among the actors of all the block level AKISs is dense in nature but not that much strong.

According to the Kruskal Wallis test (H-value), both linkage diversity and linkage strength are not significant. It is revealed that the entire district is homogenous in terms of interlinkage among AKIS actors toward agricultural knowledge and information exchange.

CONCLUSION

Jalpaiguri, a northern district in the state of West Bengal in India has actors in the wide bands of public, private, autonomous, individual, and non-government organisations on its AKIS platform that are successfully connected to create a pluralistic system of extension. The stakeholders are interconnected with each other through the five major dimensions of linkage, which are the policy and administrative dimension, research dimension, extension dimension, resource dimension, and service dimension. The linkage diversity (average value=0.79 for the district), which reflects the density of the linkage matrix, reflects that the linkage network is significantly dense among the AKIS actors in the district, even though the linkage strength is rather weak (average strength value = 0.15 for the district). The study might be carried out to determine the

connections between various state organisations for the dissemination of agricultural information to farmers.

REFERENCES

- [9]. Ali, G.T., Panda, S. and Pal, P.K (2021) Agricultural Knowledge Information System (AKIS) in Cooch Behar District of West Bengal: the Actors and their Inter-linkage with Respect to Agricultural Knowledge and Information Communication. *Biological Forum – An International Journal*13(1): 458-461.
- [11]. Berdegué, J. A. and G. Escobar. (2001) Agricultural knowledge and information systems and poverty reduction. (retrived from: <http://www.rimisp.org/FCKeditor/UserFiles/File/documentos/docs/pdf/0115-000824akisandpovertyrevisedfinal.pdf>)
- [1]. Boyaci, M. and Ö. Yildiz (2017). Agricultural knowledge and information system from extension window: the Turkish case." *Ege Üniversitesi Ziraat Fakültesi Dergisi*54(1), 37-44.
- [3]. Kaine, G. Doyle, B, Reeve, I and Lees, J. (1999). Agricultural Knowledge and Information Systems: A Network Analysis. Paper presented to the 43rd Annual Conference of the Australian Agricultural and Resource Economics Society, Christchurch, New Zealand, 20–22 January 1999.
- [4]. Nain, M. S., Singh, R., Mishra, J. R., & Sharma, J. P. (2015). Utilization and linkage with agricultural information sources: a study of Palwal district of Haryana state. *Journal of Community Mobilization and Sustainable Development*, 10(2),152-156.
- [8]. Panda, S. (2020).Pluralistic extension services—access, quality, and implications from the restructured policy reforms in Cooch Behar district of West Bengal. Ph. D. Thesis. Uttar Banga Krishi Viswavidyalaya. West Bengal. India
- [5]. Panda, S., Modak, S., Devi, Y. L., Das, L., Pal, P. K., & Nain, M. S. (2019). Access and usage of Information and Communication Technology (ICT) to accelerate farmers' income. *Journal of Community Mobilization and Sustainable Development*, 14(1), 200-205.

- [12]. Rees, D. J., M. Momanyi, J. Wekundah, F. Ndungu, J. Odondi, A. O. Oyure, D. Andima, M. Kamau, J. Ndubi, F. Musembi, L. Mwaura and R. Joldersma. (2000) Agricultural knowledge and information systems in Kenya: implications for technology dissemination and development. Agricultural Research and Extension Network (AgREN) Network Paper no. 107. London: Overseas Development Institute.
- [2]. Röling, N.G. (2004). Communication for development in research, extension, and education. Paper presented at the 9th UN Roundtable on Communication for Development 6-9 September 2004, Rome, Italy. (Retrieved from: <http://www.fao.org/nr/com/gtzworkshop/RolingPaperENG.pdf>)
- [7]. Silva, K. N. N. (2023). Social Network to Accelerate Agricultural Technology Adoption: Evidence from *Hambanthota* District, Sri Lanka. *Indian Journal of Extension Education*, 59 (1), 1-6.
- [10]. Sulaiman, V. R. (2003) Agricultural extension: Involvement of private sector, Occasional paper 29, Department of Economic Analysis and Research, National Bank for Agriculture and Rural Development (NABARD), Mumbai.
- [6]. Swanson, B. E. (1997). Strengthening research extension farmer linkages, *In*: Swanson, B. E., Bentz, R. P., & Sofranko, A. J. (eds.), *Improving Agricultural Extension. A Reference Manual* (2nd ed.), pp. 89-107.