

RESEARCH PAPER

Intradepartmental Linkages within the ICAR Agricultural Extension System: An Empirical Study from Rajasthan

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ABSTRACT

Linkages in agricultural extension refer to the systematic flow of information and services between organizations working toward common developmental goals. When organisations coordinate well with each other, they avoid repeating the same work and make agricultural programmes more effective. Intradepartmental linkages refer to the working relationship among extension units under the Indian Council of Agricultural Research, which is also known as ICAR. These units include the Agricultural Technology Application Research Institutes (ATARI), the Directorate of Extension Education (DEE) of State Agricultural Universities (SAUs) and Krishi Vigyan Kendras (KVKs). This study was carried out in Rajasthan, which is divided into ten agro-climatic zones. All ten zones were covered in the study. A total of 42 KVKs are spread across these zones, out of which 10 KVKs were selected using simple random sampling. A total of 67 extension personnel working in these KVKs were selected as study respondents. A structured questionnaire was prepared and tested before use. Data was collected by meeting each participant in person and asking them questions directly. The study found that the linkages within the ICAR extension system in Rajasthan are strong. The different units work well together and coordinate with each other in an effective manner.

HIGHLIGHTS

- ① Intra departmental linkages of ICAR extension system was assessed across all ten agro-climatic zones.
- ① All the respondents were linked with ATARI for financial support and monitoring related activities.
- ① Majority (94%) personnel showed good ATARI linkage and 83.6% showed good DEE linkage.
- ① NGO-hosted KVKs had weaker DEE linkages than SAU-hosted KVKs.

Keywords: Extension linkages, ICAR extension system, Intradepartment linkages, Indian agriculture

Linkage means connection established between two systems through the exchange of information and services. According to Havelock (1986), when barriers between systems are sufficiently permeable to allow messages and responses to flow between them, an effective linkage is created. Agbam (2010) further describes linkage as a communication and working relationship between organizations pursuing shared objectives for improved

productivity. Linkage mechanisms facilitate the flow of information among stakeholders and coordinate activities required for delivering relevant information and technologies to the farmers (Merrill-Sands, 1992).

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Strong linkages are essential for the effective and efficient functioning of agricultural extension systems. Singh *et al.* (2023) demonstrated that effective linkages among farmers and institutions play a crucial role in fostering growth within the agriculture sector. Linkages help in generation of need-based technologies, ensure timely dissemination of technologies and promote adoption by the farmers. Further, effective linkages and coordination within the extension system is crucial for sustainable agricultural development (Swanson, 2006). Linkages among institutions enable optimal utilization of scarce financial and human resources and also reduce duplication of efforts (Munyua *et al.* 2002; Kumar *et al.* 2025). In this context, the present study examines the intradepartmental linkage within the personnel working in ICAR agricultural extension system in Rajasthan. With this background in mind, this study was taken up. This study looks at how well the personnel within the ICAR agricultural extension system in Rajasthan work and coordinate with each other i.e. intradepartmental linkage.

The agricultural extension system of the Indian Council of Agricultural Research (ICAR) works through a structured system that comprise of Agricultural Technology Application Research Institutes (ATARI), the Directorates of Extension Education (DEE) under State Agricultural Universities (SAUs) and Krishi Vigyan Kendras (ICAR, 2020). ATARI works at the zonal level and is responsible for planning, coordination, monitoring and evaluation of KVK activities. Currently there are 11 ATARIs responsible for 11 zones in India. ATARI Jodhpur is responsible for planning, coordination, monitoring and evaluation of activities of KVKs in Rajasthan (ICAR, 2015). The DEE is the SAU's designated agency for accelerating agricultural growth in the state through technology transfer. It offers farmers and extension staff training, advice and farm information. The Directorate oversees, supervises and assesses KVKs operating under the purview of SAUs. It is also involved in the dissemination, assessment and refinement of technology through on-farm testing and front-line demonstrations (Swanson, 2006). At present, 33 KVKs are managed by five SAUs in Rajasthan (Pandey *et al.* 2022). The five SAUs of Rajasthan are Agriculture

University (AU) Jodhpur, Swami Keshwanand Rajasthan Agricultural University (SKRAU) Bikaner, Shri Karan Narendra Agriculture University (SKNAU) Jobner, Maharana Pratap University of Agriculture and Technology (MPUAT) Udaipur and Agriculture University (AU) Kota. In total, 06 KVKs are managed by NGOs and 03 are managed by ICAR research institutes in Rajasthan.

KVKs are district level units and interact and disseminate information and technologies directly to the farmers. KVKs conduct frontline demonstrations (FLDs), on-farm testing (OFT), training programmes and provide advisory services to the farmers (Sangwan, 2021; Dubey and Srivastava, 2007). KVK plays a vital role in conducting on-farm testing to identify location-specific agricultural technologies and demonstrating the production potential of newly released varieties of the crop in farmers' fields through frontline demonstrations (Singh *et al.* 2021; Saravanakumar, 2020). They also conduct need-based training programmes for the benefit of farmers and farm women, rural youth and extension personnel to update their knowledge and skills and to orient them in the frontier areas of technology development (Singh *et al.* 2019). KVKs also create awareness about improved agricultural technologies through a large number of extension programmes (Pandey, 2021 and Anderson & Feder, 2004).

The present study was designed to examine the intradepartmental linkage mechanisms within the ICAR agricultural extension system in Rajasthan. The institutional structure framework of ATARI, SAUs and KVKs is well established in the state. However, there was a need to assess how strong and effective the linkages within this system actually are in practice. Therefore, this study was carried out to measure the extent of these linkages through a field based empirical assessment.

Methodology

This study was conducted in the state of Rajasthan. Rajasthan is divided into ten agro-climatic zones based on its agro-climatic conditions. All ten zones were covered in this study. The main purpose of the study was to find out how well the units within the ICAR

agricultural extension system in Rajasthan are linked with each other. In this study, intradepartmental linkages referred to the working and administrative relationships that KVKs maintain with other units inside the ICAR extension system. These internal units include ATARI Jodhpur and the DEE of the five SAUs.

Rajasthan has a total of 42 KVKs (33 under SAUs, 06 under NGOs and 03 under ICAR institutes) covering all agro-climatic zones. For this study, one KVK was selected from each agro-climatic zone using simple random sampling. The ten KVKs selected were KVK Borkhera from Zone V, KVK Badgaon from Zone IVA, KVK Borvat Farm from Zone IVB, KVK Tabiji from Zone IIIA, KVK Kumher from Zone IIIB, KVK Athiyasan from Zone IIA, KVK Sirohi from Zone IIB, KVK Danta from Zone IA, KVK Sangaria from Zone IB and KVK Beechwal from Zone IC. A total of 67 personnel from these 10 KVKs were selected as the sample for this study. All the personnel working in the 10 selected KVKs were chosen as respondents for this study. The respondents included Technical Assistants (TA), Subject Matter Specialists (SMS) and Senior Scientists-cum-Head. All selected respondents were directly involved in implementing, planning and monitoring extension activities at the district level. Primary data was collected using a structured questionnaire that was carefully prepared and tested before use. The extent of linkage for various activities was recorded on a three point Likert scale. Data was collected by visiting each respondent personally at their respective KVKs and interviewing them face to face.

The data collected was analysed using simple statistical measures. Frequency and percentage were used to describe the profile of respondents and to examine the extent of linkages for various activities. Mean Performance Score (MPS) was calculated to assess the overall extent of intradepartmental linkages. For calculating MPS, a score of 3 was assigned to good linkage, 2 to average linkage and 1 to poor linkage. The MPS was then calculated by dividing the total score obtained by the maximum possible score and multiplying it by 100. Based on the MPS values, linkages were categorised as good, average or poor.

FINDINGS AND DISCUSSION

Background information: The study included 67 extension personnel in total. Of these, 10 were from DEE headquarters and 57 were from KVKs. Looking at their job roles, more than half of the respondents (58.20%) were working as Subject Matter Specialists (SMS) in KVKs. This was followed by Senior Scientists-cum-Heads (13.40%) and Technical Assistants (13.40%). In terms of age, the largest group (56.80%) fell in the 46 to 60 years age bracket. About one-third (32.80%) were between 31 and 45 years of age. This shows that most of the extension personnel were experienced, mid to senior-career professionals.

Regarding gender, a large majority of the respondents (80.60%) were male. Female functionaries made up only 19.40% of the sample. On marital status, most respondents (89.60%) were married. The educational profile of the respondents was notably strong. Nearly three-quarters (73.10%) held a PhD degree in a relevant discipline. About 22.40% had a master's degree. This indicates a highly qualified workforce engaged in agricultural extension in Rajasthan. Finally, regarding family background, a slight majority (56.70%) came from a rural background followed by 43.30 per cent with an urban background.

Intradepartmental linkages

Regarding this study, intradepartmental linkages denote the linkages between KVK and DEE and linkages of KVK/DEE with ATARI, Jodhpur. A perusal of Table 1 clearly shows that all the respondents (100%) reported linkages with ATARI for financial support and monitoring and evaluation. ATARI is the main agency responsible for monitoring and evaluation of activities carried out by KVKs and DEE. This monitoring is done in several ways. KVKs and DEE update their daily activities on an online portal. Monthly, quarterly and annual progress reports are also submitted. Scientific Advisory Committee (SAC) meetings are held regularly. ATARI also makes frequent monitoring visits to KVKs and DEE during the cropping season to review progress. ATARI ensures that the Annual Action Plan of each KVK is properly executed. This is done through

technical backstopping and field level monitoring by the DEE of SAUs as well as scientists of ATARI. Zonal Monitoring Teams are responsible for monitoring the progress of ongoing projects in KVKs and DEE. The projects currently running in Rajasthan under these teams include National Innovations in Climate Resilient Agriculture (NICRA), Attracting and Retaining Youth in Agriculture (ARYA) and Farm, Innovations, Resources, Science and Technology (Farmers FIRST). Findings of the Sulaiman and Hall (2002) also pointed out that monitoring and evaluation are among the most structured and non-negotiable functions within the ICAR extension system. These functions are built into the administrative framework and therefore all extension personnel are expected to maintain them without exception. This supports the present study's finding that monitoring and evaluation had the highest linkage percentage with both ATARI and DEE.

All the respondents (100%) reported linkages with ATARI for financial support. ATARI is the designated agency responsible for sanctioning and releasing funds to KVKs for carrying out their mandated activities. This includes funds for conducting on-farm trials, frontline demonstrations, training programmes, farmers fairs, extension activities and other operational expenses. Since every KVK depends entirely on ATARI for its financial resources, every single extension personnel working in a KVK is directly or indirectly connected to ATARI through this financial channel. No KVK can function or carry out any activity without the funds sanctioned and released by ATARI. This makes financial support the strongest and most universal linkage between ATARI and KVKs.

ATARI plays a very important role in supporting KVKs and DEE. It provides Human Resource Development (HRD) support through training and capacity building programmes. Data in the table clearly indicate that 95.50 per cent respondents had linkages for HRD activities. It also organises orientation programmes on mandated activities for extension personnel working in the system. For capacity building of extension personnel at different levels, ATARI conducts various HRD activities. These include training programmes, workshops, summer and winter schools, short courses, seminars and farmer-scientist interactions.

A very high percentage of respondents (97%) reported linkages with ATARI for meetings. This is the second highest reported linkage activity after monitoring and evaluation and financial support. ATARI Jodhpur organises zonal and state level review meetings for projects that are being implemented through KVKs and DEE. It also organises group meetings for nodal officers of KVKs under the National Food Security Mission (NFSM) and the National Mission on Oilseeds and Oil Palm (NMOOP). Resource persons are invited to these meetings from ICAR institutes and SAUs to deliver lectures on production practices and improved technologies of pulse and oilseed crops. These meetings therefore serve a dual purpose. They help in reviewing progress as well as in updating the knowledge and skills of extension personnel. The very high percentage of respondents reporting this linkage shows that meetings are a well established and regularly maintained channel of communication between ATARI and KVKs in Rajasthan.

About 94 percent of the personnel reported linkages for planning of activities. ATARI organises a state level annual planning workshop for DEE and KVKs so that all mandated activities can be planned and carried out properly. In this workshop, a presentation of the work plan for the coming year is made by the Head of KVKs and DEE. The plans are discussed in detail and then finalised. It conducts SAC meetings once a year in every KVK. The SAC meeting is a very important platform where scientists, administrators and other stakeholders come together to review the work done by the KVK in the past year and to give recommendations for the coming year. It helps in keeping the activities of each KVK aligned with the broader goals and mandates of the ICAR extension system. The high percentage of respondents reporting planning linkages clearly shows that planning is a well structured and regularly maintained activity within the ICAR extension system in Rajasthan.

Technical support linkages between ATARI and KVKs were reported by 86.60 per cent of respondents. Providing technical backstopping to KVKs is a core mandate of ATARI and is built into the formal institutional structure of the ICAR extension system. KVK personnel regularly

depend on ATARI scientists for guidance on technical matters related to crop production, pest management, soil health and other agricultural challenges faced in the field.

The linkage between ATARI and KVKs for organisation of farmers fairs was reported by 83.60 per cent of respondents. Officials of ATARI are also invited as dignitaries in farmers fair organized by the KVK/DEE. This percentage is slightly lower compared to other activities like monitoring and evaluation and financial support. This can be explained by the fact that farmers fairs are not organised by every KVK every year and ATARI's role in these events is participatory rather than mandatory. Geographical distance between some KVKs and ATARI Jodhpur may also have contributed to this lower percentage.

Helpline service linkages between ATARI and KVKs were reported by 79.10 per cent of respondents. The nature of this linkage is primarily need based. This means that KVK personnel approach ATARI through helpline services only when they face a specific problem or require urgent technical guidance that cannot be resolved at the KVK level. KVK personnel also use helpline services to seek guidance on queries raised by farmers that require expert level answers.

More than two third of the respondents reported linkages for publications (71.60%) related activities. ATARI, Jodhpur invites articles and success stories from extension personnel for publication in the magazine "*Krishi Gyan Ganga*". Further, it also ensures that success stories, case studies and impact assessments of KVK activities are properly documented.

Further data of Table 1 clearly show that linkage between KVK and DEE exist for activities like monitoring and evaluation (100%), HRD activities (92.50%), meeting (88.10%), visit (85%), organization of farmers fair (80.60%), publications (77.60%), technical support (74.60%), financial support (67.20%) and helpline services (61.20%). Only the KVK hosted by SAUs have financial linkage with DEE while KVKs hosted by NGOs don't have this link. DEE and KVK are linked with each other through meetings like SAC (*Scientific Advisory Committee*), pre-ZREAC (*Pre-Zonal*

Research and Extension Advisory Committee Meeting) and ZREAC (*Zonal Research and Extension Advisory Committee Meeting*). DEE also organizes visits to the KVK for monitoring purposes while KVK personnel visit DEE for presentation and discussion of the action plan for the coming season. The Directorate provides guidelines for conduction of extension programs to KVKs as per the directives received from ATARI. Collaboration also exists for documentation of available knowledge through literature development like farm magazines, books, technical bulletins, newsletters, etc. on agriculture and allied subjects. Besides this, various training and workshop sponsored by different agencies and organizations are conducted by the DEE in collaboration with KVK. DEE also organizes training programmes, summer/winter schools for teaching and technical staff of KVKs. DEE teaching staff is also invited in KVK to deliver a lecture on farmers training. Beside, DEE via. ATIC provides technical products like seeds, planting material to KVK to conduct FLDs and for raising seedling/planting material, etc.

Table 1: Intradepartmental linkages of the extension personnel for various activities (n = 67)

Sl. No.	Activities	f (%)	
		ATARI	DEE/KVK
1	Meetings	65 (97.00)	59 (88.10)
2	HRD activities like trainings	64 (95.50)	62 (92.50)
3	Visit	57 (85.00)	61 (91.00)
4	Publication	48 (71.60)	52 (77.60)
5	Technical support	58 (86.60)	50 (74.60)
6	Helpline service	53 (79.10)	41 (61.20)
7	Financial support	67 (100.00)	45 (67.20)
8	Monitoring and evaluation	67 (100.00)	67 (100.00)
9	Planning of activities	63 (94.00)	53 (79.10)
10	Farmers fair	56 (83.60)	49 (73.10)

In case of the extent of intradepartmental linkage, data of Table 2 show that respondents (94%) had good linkages with ATARI followed by 6 per cent who had average linkage. None of the respondents had poor linkages with ATARI. Regarding linkages between DEE and KVK, 83.60 per cent of respondents reported good linkages and 16.40 per cent reported average linkages.

Similar findings were reported by Waman and Khalache (2010) in their study on institutional linkages of KVKs.

The study also found that KVKs hosted by Non-Governmental Organisations (NGOs) had fewer linkages with DEE as compared to KVKs hosted by SAUs. This finding is supported by Kumar *et al.* (2025), who found similar results in Bundelkhand, where NGO actors had weaker ties with other institutional partners. Singh *et al.* (2023) also pointed out that the type of host organisation of a KVK has an effect on how well it connects with other units in the system.

Table 2: Extent of intradepartmental linkages of the extension personnel (n = 67)

Sl. No.	Organizations	Extent of Linkages			MPS
		Good f (%)	Average f (%)	Poor f (%)	
	ATARI	63 (94%)	04 (6.00%)	00	89.25
	DEE	56 (83.60%)	11 (16.40%)	00	79.85

It is evident from Fig. 1 that the overall extent of intradepartmental linkage was found good among the extension personnel of ICAR in Rajasthan. The majority of the respondents (94%) had good linkages and 6 per cent had a medium extent of linkages.

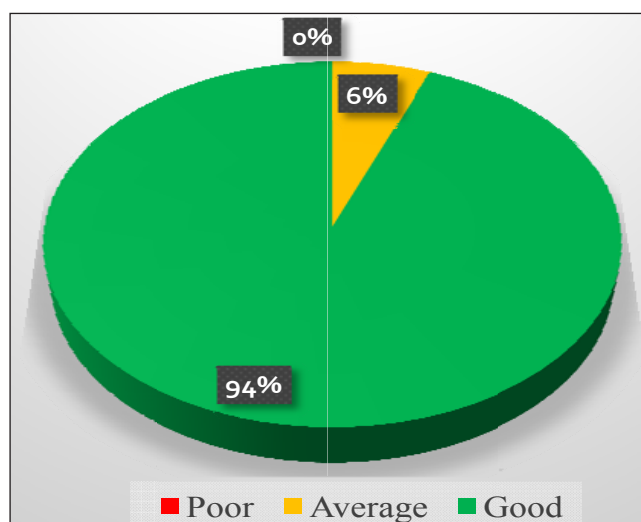


Fig. 1: Extent of overall intradepartmental linkages maintained by the extension personnel

None of the respondents had poor linkages. Intradepartmental linkages was found good due to

the reason that fund for extension work is sanctioned from these two institutions (ATARI/ DEE) and extension personnel have accountability towards these organizations and extension personnel are also answerable to officials of ATARI and DEE.

CONCLUSION

Intradepartmental linkages help in avoiding duplication of efforts, ensuring better resource utilization and enhancing the delivery of agricultural technologies to farmers. This study concludes that intradepartmental linkages within the ICAR extension system in Rajasthan are strong. Almost all respondents reported good linkages and none of the respondents reported poor linkage. Effective linkages were found in areas of planning, financial support, HRD activities, technical guidance, monitoring and evaluation. That reflects a stable and structured intra departmental linkage system. Clearly defined roles, clear structure, accountability mechanisms, regular meetings and structured reporting systems mainly contributed to these strong linkages. However, there is still a need to strengthen linkages in areas where institutional gaps exist. This will help improve the overall efficiency and sustainability of agricultural extension services in Rajasthan. Further there is a need to strengthen linkages in the areas where institutional gaps exist so that overall efficiency of agricultural extension services can be enhanced in Rajasthan.

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