

# **Constraints in organizations of agricultural knowledge creation, information management and technology delivery system in Bundelkhand Region of Uttar Pradesh, India**

## **Abstract**

The present study was conducted to delineate the various constraints faced by the institutions doing agricultural knowledge, information management, and technology delivery. The Bundelkhand Region of U.P. was purposively chosen for this study because of the presence of major institutes such as the Indian Grassland and Fodder Research Institute (IGFRI), Central Agroforestry Research Institute and agricultural universities located in Banda and Jhansi, ICAR KVKs, state government line departments, ATMA and many related NGOs. Secondary data were collected through the study of extant literature. Identified major constraints were sorted out with the help of experts. Primary data was collected from officials of every organization through direct personal interviews and focussed group discussions. The total sample size was 50. The constraints were grouped into three categories; that is, constraints in knowledge creation, information management, and technology delivery. Rank Based Quotient (RBQ) method was used to quantify the responses, in order to establish the major constraints with severe effects. Findings revealed there is a need for knowledge experts to periodically train the work-force of the sampled organizations to update the skill of the scientists. Such up scaling of employees' knowledge would increase digitalization, improve effective management of information; enhance coordination among different organizations while reducing duplicative efforts or misplaced efforts.

**Keywords:** *Constraints, digitalization, duplicative efforts, and poor coordination.*

## **Introduction**

Agriculture is the fundamental sector of Indian economy. Even though the contribution of this sector towards the Gross Domestic Product (GDP) is showing a declining trend from about 30 per cent in the year 1990 - 1991 to 17.5-18 per cent in the year 2022 -2023, the agricultural sector still forms the mainstay of our country's development (The Hindu, 2023). According to the 2015–2016 agriculture census, the distribution of landholding reveals a significant prevalence of marginal holdings (<1 ha), making up 69 per cent. Subsequently, smallholdings (1–2 ha) constitute 18 per cent, while semi-medium (2–4 ha) and medium (4–10 ha) holdings combined contribute 13 per cent. Large holdings (>10 ha) make up only one per cent of the overall distribution (Kareemulla *et al*, 2021). Knowledge holds immense value as a vital asset and a pivotal organizational resource. It encompasses individual discernment, values, competencies, capabilities, practical know-how, and methodologies. Knowledge management involves the deployment of strategies and processes within an organization to enhance the efficiency of business operations, realize knowledge objectives, and uphold sustained organizational performance (Kordab *et al*, 2020). In India, multi-prolonged institutional arrangement along with NGOs and non-profit organizations and even farmers themselves involved in these various activities like creating the knowledge and disseminating the information. ICAR institutes like research institutes, KVKs, agricultural universities, line departments, and progressive farmers also stand in the front line. These are mainly involved

in the functions like generating the knowledge that is knowledge creation, converting and storing the knowledge into a digestible form that is information management and finally disseminating that information and technologies to the farmers successfully. The ICAR institutes have generated a number of technologies and information through concentrated research efforts. Many innovations and technologies tend to remain restricted to the laboratory, primarily because of insufficient connections between technology developers and disseminators. (Kathayat *et al*, 2022).

In Bundelkhand region also some of the ICAR institutions such as Indian Grassland and Fodder Research Institute (IGFRI), Central Agroforestry Research Institute and agricultural universities located in Banda and Jhansi respectively. ICAR KVKs, state government line departments, ATMA and many of the NGOs working in creation and dissemination of the technologies and information. But the information is not reaching to farmers in this region successfully. The poor agricultural situation in Bundelkhand is hitting the newspaper headlines frequently. Hence it is very essential to study the factors which are hindering the process of knowledge creation, information management, and technology delivery process. It is necessary to rate the constraints from organization people to get an overall view of the constraints faced by the organizations.

### **Material and methods**

Among the seven districts of Bundelkhand Region of U.P, Jhansi and Banda Districts are purposively selected for study purpose due to the location of ICAR research institutes and agricultural universities. The data was collected from IGFRI, CAFRI, RLBCAU, BAUT and ATMA and NGO officials. The total sample size was 50. The data was collected from officials from various institutes through personal interview and focussed group discussion. Initially, a list of constraints was collected through review of the literature and sorted out with the help of experts. Then the constraints were grouped into three categories like constraints in knowledge creation, constraints in information management, and constraints in technology delivery. The officials were asked to rank the constraints according to the severity felt by them. The listed constraints were then quantified through Rank Based Quotient technique (RBQ) (Sabarathnam, 1988), which is as follows:

$$RBQ = \frac{\sum f_i (n + 1 - i)}{N \times n} \times 100$$

$F_i$  = Frequency of farmers for the  $i$ th rank of the problem

$n$  = Total number of ranks

$i$  = Rank given by the respondents

$N$  = Total number of respondents contacted

## Results and Discussion

The constraints perceived by the officials in the process of knowledge creation, information management and technology delivery namely are discussed below.

### Constraints in Knowledge creation

It could be argued from Table 1 that major constraint identified in knowledge creation was the want for knowledge experts to train the work-force periodically (RBQ score 100.26). To increase the capacity and skill of scientists working in the institute, efficient master trainers were found very essential. The second severe most constraint was underinvestment in IT infrastructure (RBQ score 75.2). Because IT can enable data-intensive research with the provision of the specialized staff and infrastructure that facilitate collaboration, efficiency, and data storage. The third severe constraint, most of the institutes felt was the lack of learning opportunities and lack of horizontal integration (RBQ score 54.31). In today's knowledge economy, knowledge sharing is equally crucial as creation. The least severe constraint identified was learning from project failures (RBQ score 4.17).

**Table1: Constraints in knowledge creation**

	Particulars	RBQ Score	Rank
Constraints in Knowledge creation	1. Underinvestment in IT infrastructure	75.2	II
	2. Bureaucratic interference	37.6	IV
	3. Hoarding of knowledge by knowledge-experts	37.6	IV
	4. Want for knowledge experts to train the work-force periodically	100.26	I
	5. Lack of learning opportunities	54.31	III
	6. Inefficient systematic knowledge capture	20.88	V
	7. Lack of horizontal integration; e.g., between the management, the workforce and the external environment (project-clientele exposure, lack of 'engagement', etc.)	54.31	III
	8. Learning from project failures	4.17	VI

### Constraints in information management

Knowledge management (KM) is a critical factor for enhancing agricultural productivity and sustainability in India (Acharya & Agrawal, 2022). KM involves the creation, capture, sharing, and utilization of knowledge to improve decision-making and problem-solving in the agricultural sector (Singh & Singh, 2022). Among constraints related to information management, lack of digitalization was perceived as a severe constraint (RBQ score 91.91). Easy handling and storing of information are possible through digitalization. But the present situation prevailing among the Agri-KITS is not conducive for easy data management. The

second most severe constraint was a high volume of research information and lack of tools for proper storage. The lack of space and maintenance, as well as unskilled record managers, were ranked fourth and sixth, emphasizing the need for proper infrastructure and skilled personnel in managing agricultural information effectively. Farmers and agricultural stakeholders often face a deficit in the capacity to effectively manage knowledge (Kumar & Pandey, 2022). The least severe constraint found was lack of accuracy and authenticity (RBQ score 20.88). Many of the institutions were using authentic data for the technology creation and information delivery. Hence this constraint was less severe as compared with others.

**Table 2: Constraints in information management**

	Particulars	RBQ Score	Rank
<b>Constraints in Information management</b>	1. Lack of institutional policies	33.42	III
	2. High volume of research information and lack of tools	50.13	II
	3. Lack of digitalization	91.91	I
	4. Lack of space and maintenance	29.24	IV
	5. Lack of security for information and knowledge	33.42	III
	6. Lack of accuracy and authenticity	20.88	V
	7. Unskilled record managers	29.24	IV

### **Constraints in technology delivery**

Among the constraints related to technology delivery, poor coordination among different organizations (RBQ score 87.73) was found as most severe. The study is in accordance with the observation that there is frequently an absence of coordination and collaboration among various organizations engaged in technology delivery. This lack of alignment results in duplicated efforts, fragmented services, and ineffective communication (Singh & Singh, 2021). Even though many institutes are working in the same area there was no proper coordination among them which was leading to duplication of efforts and also sometimes no efforts at all in particular area. The second most severe constraint felt by organizations was insufficiency of fund (RBQ score 83.55). Finance is the basic requirement which drives all other facilities. To carry out the institutional activities efficiently, finance was necessary. The research is also in line with the identified constraint in technology delivery, which is the lack of access to credit or other financial resources for investing in new technologies or procuring inputs (Bhatia & Kaul, 2021). The least severe constraint was a high level of illiteracy among the farmers (RBQ score 37.6). Illiteracy among farmers was not perceived as a serious constraint for technology delivery by the institutional officials.

**Table3:Constraints in technology delivery**

	<b>Particulars</b>	<b>RBQ Score</b>	<b>Rank</b>
<b>Constraints in technology delivery</b>	1. Untimely supply of necessary technologies required due to logistic problems	41.77	V
	2. Lack of clear vision in the farmers due to multiple organization intervention	45.95	IV
	3. Reduction of linkages between organizations and farmers	79.37	III
	4. Insufficient finance availability	83.55	II
	5. Poor coordination among different organizations	87.73	I
	6. Farmers lack of interest in participating in extension programs	45.95	IV
	7. High level of illiteracy among the farmers	37.6	VI

**To resolve these constraints, some of the strategies suggested were:-**

- Robust training and skill development program ensures that staff is well-versed and equipped with knowledge of recent advances in technology. It enhances the skill and knowledge of scientists, thus helps for increasing the productivity of an organization. Hence to train this workforce regularly, training sessions and workshops by master trainers like experts and subject matter specialists have to be conducted.

- Information Technology infrastructure plays an important role in automating complex function by introduction of user-friendly easy solutions. Hence attention should be given to improving infrastructure by adopting modern IT tools.

- To overcome the problem of a large volume of research information, the adoption of proper tools is needed for storing, processing and disseminating research information.

- There should be an increased extent of digitalization of the available information as it helps for easy access of information and data storage. Through digitalization, information can be successfully delivered to end users who are located in remote areas and can be retrieved easily.

- The research tie-ups, workshops and collaborations between different organizations are

needed as it creates the synergistic effect in the research and facilitates easy sharing of resources and innovative ideas.

- The government has to give priority to R and D sector in agriculture by providing finance to research institutions at the right time. An institutional level arrangement can be done through some innovative ideas like tie-up with local private organizations for information support, selling the institutional products like nursery samplings, seeds and magazines.

### **Conclusion**

Across the three domains of technology delivery, information management, and agricultural knowledge creation, the study explored the constraints within organizations operating in the Bundelkhand Region of Uttar Pradesh. Significant challenges were identified through the research, ultimately leading to the conclusion that these constraints are a major issue.

The need for skill enhancement among scientists was mostly met by periodic training from knowledge experts, making it the primary constraint in knowledge creation. The significant hurdles in this field included underinvestment in IT infrastructure and the absence of learning opportunities.

The efficient handling and storage of information faced a significant hurdle: the absence of digitalization. Storage shortcomings and unwieldy masses of research data compounded the difficulty.

Skewed technology delivery was primarily caused by poor coordination among different parties involved. This caused a duplication of efforts and inefficiencies which proved to be a significant constraint. Additionally, the lack of sufficient funds was identified as the second most critical constraint. This highlighted the essential role of financial support in driving institutional activities.

Robust training and skill development programs for staff, improvements in IT infrastructure, adoption of proper tools for managing research information, increased digitalization and enhanced collaboration between organizations are recommended by the study to address these challenges. Also, it was suggested that the government should prioritize the research and development sector, provide timely financial support as well as establish innovative partnerships with local organizations.

Essentially, it is important to address these constraints to optimize knowledge creation, information management and technology delivery in agriculture of the Bundelkhand Region leading to agricultural development and sustainability in that region.

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