

# A review of Agricultural Innovation Systems (AIS): Features, Capacity Building, Diagnostic Assessment, Deficiencies

Nisha Grakh<sup>1\*</sup>, Dr. Pardeep Saini<sup>2</sup>

<sup>1</sup> Research Scholar, Sunrise University, Alwar, Rajasthan

<sup>2</sup> Assistant Professor, Sunrise University, Alwar, Rajasthan

**Abstract** - *Agricultural innovation systems approach is necessary in the current demanding and complex nature of agriculture with the rising institutional heterogeneity in agricultural extension and advisory service delivery. Well co-ordinated, mutually beneficial cooperation among them may bring together ideas, information as well as improved organizational culture and resources to work for the improvement of farmers. Multi-stakeholder collaborations and innovations are the avenues for future agricultural extension and consulting services to reach needy farmers and others. In this study evaluation of the Agricultural Innovation Systems(AIS), features of AIS, capacity building for AIS, diagnostic assessment of AIS, deficiencies of AIS.*

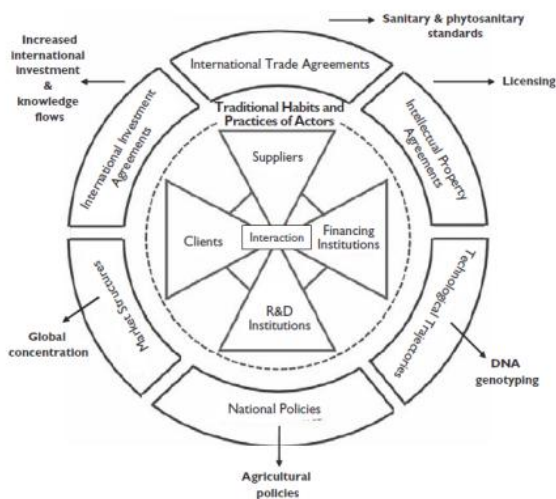
**Keywords** - *Agricultural Innovation Systems(AIS), elements, capacity, development, diagnostic assessment*

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## INTRODUCTION

For a long time now, agriculture has been a major topic in the global development debate. Agriculture is critical to the development of rural communities in developing nations, but the sector faces a broad range of difficulties, from infrastructure to global commerce, that need to be addressed. There are many changes taking place in agricultural extension and advisory services as a result of this. This organization, which began as an agricultural technology agency, has gone a long way since its inception. Changes in political and financial backing, as well as reduction and decentralization of the public extension system and growing pluralization with private and civil society organizations, and ICT-based services, have made it a crucial component of rural development. In countries like India, where pluralistic AEAS are popular, it is especially important to coordinate the efforts of AEAS stakeholders and researchers and technologists in order to meet the many difficulties facing the agricultural sector. We've moved from technology transfer and advice to boosting the innovation capability of diverse stakeholders at Aes.[1] An approach known as the Agricultural Innovation Systems school of thought stresses the need of fostering a culture of innovation among the many stakeholders involved in agricultural production. As a way to better understand how knowledge is generated, shared, accessed and exchanged across stakeholders, an innovation system framework has been developed. Agricultural

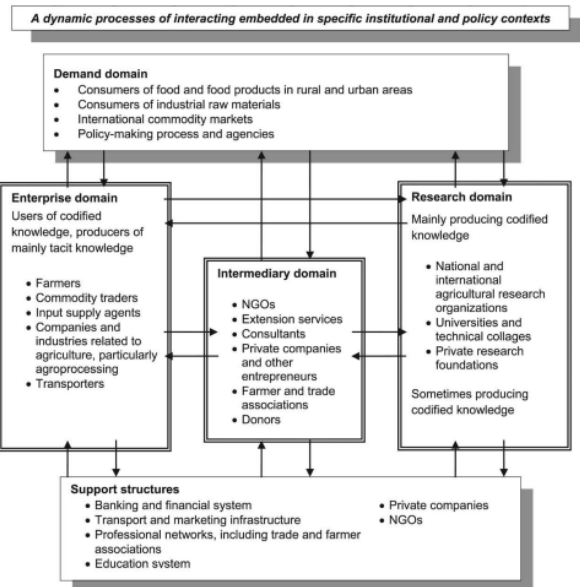
technology management agency in India is an example of an agency that isn't just motivated by research. Agricultural Innovation Systems are gaining traction and should be addressed, implemented, and worked on in agriculture and related sectors due to a growing focus on convergence, greater innovation capability, and holistic development in national and international development arenas. We hope that presenting and exploring the notion of agricultural innovation systems (AIS) throughout the last several decades will help start a conversation in this issue of Extension NEXT. In addition, the book discusses the elements of AIS—a complex system of actors with dynamic roles that change over time and are strongly influenced by the spatial pattern of their components; a few case studies from across the globe to understand how AIS works and the role extension plays in it; and capacity development in Agricultural Innovation Systems(AIS) using the common framework for capacity development as it recognizes the diverse actors, rules, and processes pre-existing in the system. Resources on AIS are introduced in this issue, as well as information on the implications of Agricultural Innovation Systems (AIS) for extension. These resources are appropriate for a wide range of players in agricultural development.[2]



**Figure 1: A stylized innovation system**

## **ELEMENTS OF AGRICULTURAL INNOVATION SYSTEMS(AIS)**

In the context of agricultural innovation systems (AIS), the geographical distribution of the organizations' constituent parts has a significant impact on the dynamic and functional features that alter continually over time. Systemic innovation, with its diverse roles, illustrates the institutional aspects that control how components interact and new knowledge is generated inside a given system. External and internal agencies have been categorized as exogenous and endogenous, respectively, when it comes to innovation systems. In the process of creating, disseminating, and making use of commercially viable information, actors and aspects of an innovation system interact.[3] Agricultural Innovation Systems(AIS) have been defined as a network of organizations and individuals, as well as the institutions and policies that influence their behavior and performance, by a number of scholars. actions conducted, such as knowledge creation, knowledge dissemination via networks, guiding of the search, market information, resource mobilization, entrepreneurial activities, and counteracting opposition to change. internal and external players and institutions have varying degrees of effect on the innovation systems in both the endogenous and exogenous innovation systems. As a fundamental property of systems, IS necessitates an understanding of the system as a collection of linked parts with diverse qualities that change with time and place.[4]

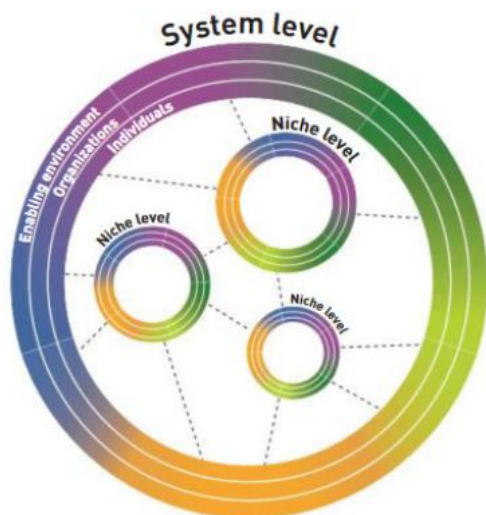


**Figure 2: Elements of Agricultural Innovation Systems**

## **CAPACITY DEVELOPMENT FOR AGRICULTURAL INNOVATION SYSTEMS(AIS)**

Agriculture Innovation Systems (AIS) have an essential role to play in the development of local capacity (CD) since innovation must be locally relevant and not merely a copy of technology and processes from "foreign research". To produce, systematize, and adapt knowledge in order to adopt and scale up new methods, it is necessary to build endogenous capacity. To understand the AIS approach to CD, it is important to understand the system's current players and processes. CD interventions must be designed and implemented in a way that takes into account the interdependencies of the system at all levels and the roles they may play.[5] Capacity to traverse complexity, cooperate, reflect on one's own learning, participate in strategic and political processes and adapt and react are all essential to realizing the promise of innovation. This requires creative and methodical techniques in CD. Each component of IS is dealt with in its own right in the CD method, which acknowledges its interrelationships and synergies with the other three dimensions of IS - person, organizational, and the enabling environment. An innovative niche is identified in the AIS CD conceptual approach as one in which CD takes place around a particular innovation agenda and focuses on two aspects: I the functions and performance of the whole IS at the systems level. AIS's CD framework consists of five sequential processes at the innovation niche level: (a) galvanizing commitment; (b) visioning and planning; (c) assessing capacity needs; (d) formulating a CD strategy and action plan; and (e) putting it into practice. While the cycle is a framework for action that may vary greatly based

on local or national context, it is also an ongoing process that needs constant reflection and documenting for future modification and execution. There is just one consistency throughout the various contexts: the systemic approach, which guarantees that all participants in the system have equal access to engage.[6]



**Figure 3: Conceptual approach in Capacity Development for Agricultural Innovation Systems(AIS)**

### DIAGNOSTIC ASSESSMENT OF AGRICULTURAL INNOVATION SYSTEMS(AIS)

Basic knowledge about players in an innovation system—their kind, responsibilities and functions, learning and linkage—helps to uncover information about what's operating effectively in the system..” Sector mapping may be broken down into four parts: locating relevant organizations, assessing the scope of their expertise, identifying the players in the sector, and determining the kind and degree of connections between those organizations that are important to sector innovation.[ 7]

**Typology of actors:** Easy-to-understand information about the kind of organizations that are expected to play a significant role in a sector's innovation system.

- NGOs and the corporate sector may also play a part in the research domain, although official research organizations providing predominantly codified information are the primary focus.
- Tacit and codified knowledge are used extensively in the corporate domain, whereas tacit knowledge is generated in the demand domain by customers and the worldwide marketplaces for goods.
- Policymakers are included as well. Actors in the innovation system have an interest in and need for knowledge and information

created by the innovation system (to guide policy), hence they should be seen as part of the system just as any other consumer would.

### Extent of competency in existing organisations:

Getting an understanding of the underlying abilities and the amount to which these skills may assist problem solving, creativity, and innovation requires understanding the variation between the aforementioned typology of stakeholders and their competences. There will be a need for a large number of scientists, managers, and marketing specialists to fill these roles. Depending on the organization, the sorts of competences that should be examined will vary. [8]

**Role of actors:** Organizations outside the government are playing an active role in creating and developing possibilities in a successful innovation system. It's also crucial to consider job flexibility since tightly defined positions don't provide organizations the flexibility needed to adapt to changing conditions.

### Existence and nature of linkages between organisations relevant to innovation in the sector:

An successful innovation system relies heavily on the interactions between individuals and organizations. As a first step, it's vital to identify the broad patterns of interaction by mapping the links in a generic form and then understanding their nature and function. An organization's linkages to other players in the system may be distinguished by its kind of linkage and purpose..

### SHORTFALLS OF AGRICULTURAL INNOVATION SYSTEMS (AIS)

Stakeholder capacity building as well as multi-stakeholder engagement are becoming more important as the AIS idea gains traction in emerging nations. Smallholders, agriculture cooperatives, and agribusinesses aren't getting enough attention from the national AIS when it comes to capacity building. However, theoretically, agricultural producers are the most important participants in agricultural innovation systems (AIS), but this is not always the case in reality. Extension professionals must be helped to understand and explore their roles and duties via participatory learning in order to improve their organizational capability.[9] For active knowledge creation, learning through interaction among stakeholders takes precedence over addressing strictly technical challenges when it comes to fostering agricultural innovation and innovation potential. Stakeholders from a variety of scientific fields, as well as development organizations, must come together to address issues in agriculture. With the power dynamics in innovation platforms and opportunistic behavior of those in positions of authority, as well as the difficulty of defining and

enforcing standards in this environment, issues arise. Despite the fact that "knowledge integration" and "participatory approach" are the buzzwords in their implementation, they sometimes operate as a hindrance to a genuine participatory mode in AIS. Because it recognizes a wide range of ways that may be tried with and modified for innovation, the AIS framework makes it difficult to understand and prescribe in addition to these operational flaws. Interpersonal facilitation and operational abilities such as brokering and creating relationships are either lacking or in short supply when it comes to boosting networking and new idea generation.[10]

## **IMPLICATIONS FOR EXTENSION AND ADVISORY SERVICES (EAS)**

1. Research-generated knowledge is an essential part of Agricultural Innovation Systems (AIS), but EAS must also be functionally active in order to effectively use and determine the consequence of the information on the key players in innovation systems'.
2. The players in agricultural innovation systems (AIS) must adapt to the changing social, economic, and political framework in which agriculture operates. When used in conjunction with EAS, actors might become more aware of how their roles have evolved.
3. The success of innovation systems depends on the cooperation of producers, research organizations, value chain players, industry, and governments. EAS has the ability to bring together all of the players in a partnership and stimulate cooperation for the purpose of sustaining those relationships.
4. A greater emphasis on sustainability necessitates a shift in Agricultural Innovation Systems (AIS) in favor of policies that benefit the poor, the environment, and small businesses alike. The EAS system is capable of locating and connecting rural communities with the resources they need.
5. With a comprehensive public EAS network in countries like India, it may boost contact among the participants in innovation systems, foster an enabling policy environment and support small-scale farmers.
6. By identifying the actors/stakeholders in an innovation system and encouraging the development of sustainable innovation capacity by focusing on the activities that promote innovation, EAS may operate as a sector-coordinating organization and foster sustainable innovation.
7. Agricultural Innovation Systems (AIS) actors need to be trained in order to implement behavioral and organizational change. Cooperation between national and regional extension organizations in the development

of functional and behavioral skills might be beneficial.

## **CONCLUSION**

Mainly, agricultural innovation systems (AIS) aim to improve the abilities of stakeholders, foster an institutional framework that supports the flow of information, as well as develop policies and practices that influence how effectively these interactions operate. To better understand how information flows between stakeholders in a system, an innovation systems approach focuses on both the individuals and their networks. This shift from a research-driven innovation process to an interactive process that includes a wide variety of activities, actors, practices, policies, and context has occurred in recent years. The rural areas of developing nations, which house the majority of the world's most vulnerable people and many of the planet's most important natural resources, may benefit greatly from innovation as a catalyst for social and economic transformation. The systems approach's parts have altered through time as it has become more necessary in today's environment and also more important in its expansion. An agency for technology transfer has developed into one that facilitates engagement and learning, rather than instruction and demonstrations. When viewed from the perspective of an innovation systems perspective, extension and rural advisory services are defined as systems that 'facilitate the access of farmers and their organizations to knowledge, information, and technologies; facilitate their interaction with partners in research and education; and assist them with the development of their own technical, organizational, prac It strives to offer a supportive context for rural players to enable their potential for innovation. It is becoming increasingly important for the public sector (in the Indian context, agencies like ATMA) to play a leading role in facilitating collaboration, fostering innovation, and brokering connections among the stakeholders to ensure effective development efforts in agricultural innovation systems (AIS).

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### **Corresponding Author**

**Nisha Grakh\***

Research Scholar, Sunrise University, Alwar, Rajasthan