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Revitalizing Agricultural Extension in India: Institutional Innovations for Inclusive and Sustainable Outreach

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Abstract: -

India's agriculture faces unprecedented demands and complex challenges, ranging from climate vulnerability and fragmented landholdings to nutritional security and declining farm incomes. In this scenario, agricultural extension emerges as a crucial bridge between technology and farmers. This article explores key institutional innovations and extension reforms in India that have contributed to inclusive outreach and sustainable rural development. Emphasizing models like the Agricultural Technology Management Agency (ATMA), Krishi Vigyan Kendra's (KVKs), and ICT-led approaches, it showcases how convergence among public, private, and civil society actors has enhanced the responsiveness, relevance, and reach of agricultural advisory systems. Recent initiatives, including climate-smart villages, women-led mechanization groups, and translational research, are transforming the future of agricultural extension in India.

Keywords: Agricultural extension, ATMA, Krishi Vigyan Kendra, climate-smart villages, farm mechanization, ICT in agriculture, India, inclusive development, institutional innovation, sustainable outreach etc.

1. Introduction:

India's agricultural sector supports over 43% of the population while contributing approximately 18% to the national Gross Value Added (GVA) as of 2023 (MoSPI, 2023). With increasing urbanization, income growth, and a projected population of 1.62 billion by 2050, the pressure on agriculture to provide safe, nutritious, and sufficient food is immense (Singh & Burman, 2019). At the same time, structural constraints—like small

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and marginal landholdings, market inefficiencies, and environmental degradation—undermine the productivity and sustainability of farming systems.

In this evolving context, **agricultural extension** plays a pivotal role. Not only is it responsible for transferring innovations from research to the field, but it also serves as a platform for capacity building, risk mitigation, and income diversification. Over the past decades, India has introduced a series of **institutional reforms and extension innovations** to improve the effectiveness and inclusivity of its outreach systems.

2. Extension Reforms: From Top-Down to Participatory Models

Historically, India relied on the **Training and Visit (T&V) system**, which though systematic, lacked adaptability and accountability to farmers. The **Agricultural Technology Management Agency (ATMA)** model emerged as a response to these gaps. Supported initially by the World Bank, ATMA introduced a decentralized, demand-driven framework that emphasized multi-stakeholder participation and convergence of various extension providers (Singh, 2015).

Under ATMA:

- District-level extension planning became participatory, involving **Farmer Advisory Committees**;
- Extension was integrated with **commodity boards, NGOs, and private players**;
- The focus shifted to bottom-up planning, convergence of schemes, and greater financial autonomy at the district level.

ATMA today serves as a key mechanism under India's **Support to State Extension Programmes for Extension Reforms**.

3. The Role of Krishi Vigyan Kendras (KVKs)

KVKs—established by ICAR—form the **frontline extension system** in India. With over 700 KVKs across the country, these farm science centers act as **knowledge and resource hubs** for technology assessment, on-farm trials, demonstrations, and skill development. Their key contributions include:

- **Climate-Smart Agriculture:** Under the National Innovations on Climate Resilient Agriculture (NICRA), KVKs have implemented models like zero tillage, water-smart techniques, and agroforestry in drought- and flood-prone regions.
- **Women Empowerment:** Initiatives like the "Paddy Task Force" in Kerala trained all-women groups in mechanized transplanting and

harvesting, improving incomes and social recognition.

- **Nutritional Security:** Backyard poultry, kitchen gardens, and biofortified crops have been promoted by KVKs to address malnutrition.
- **Tribal Outreach:** KVKs in tribal districts of Madhya Pradesh facilitated seed production cooperatives, benefiting over 700,000 tribal farmers.

The convergence of KVKs with ATMA, NGOs, and state departments has ensured a holistic and localized approach to agricultural development.

4. **Digital and ICT-Led Extension Innovations**

Information and Communication Technology (ICT) has revolutionized how agricultural extension is delivered:

- **vKVK (voice Krishi Vigyan Kendra):** A mobile-based platform for two-way communication between experts and farmers using voice messages in regional languages.
- **mKisan Portal:** As of 2023, over 1.2 billion SMS advisories have been delivered to more than 90 million registered farmers, offering real-time weather updates, market prices, and crop management advice (MoA&FW, 2023).
- **KVK-Net:** A digital knowledge-sharing platform where extension workers can collaborate, share experiences, and co-develop advisories.

These ICT platforms enhance **reach, speed, and personalization** in extension service delivery—especially critical in remote and underserved areas.

5. **Public-Private Partnerships and Civil Society Engagement**

While the public sector remains the backbone of India's extension system, **private sector and civil society organizations (CSOs)** now play a growing role:

- **Private Sector:** Companies like Tata Chemicals (through Tata Kisan Sansar) and ITC (e-Choupal) deliver bundled services—input supply, advisories, and marketing—especially in remote regions.
- **NGOs and SHGs:** Organizations such as PRADAN and BAIF empower rural communities, especially women and youth, through participatory learning models and farmer field schools (PRADAN, 2014).
- **Contract Farming and Embedded Services:** Increasingly, agribusinesses provide extension services as part of contract agreements, ensuring that farmers follow quality protocols and receive timely technical support.

This pluralistic model has improved **coverage, accountability, and responsiveness** of the extension system.

6. Future Pathways: Inclusivity, Innovation, and Integration

To achieve **sustainable, inclusive, and market-oriented agriculture**, the future of agricultural extension in India must focus on:

- **Farmer-Led Innovations:** The Farmer FIRST initiative by ICAR encourages farmer-scientist partnerships for demand-driven technology development.
- **Youth Engagement:** Through programs like **Attracting and Retaining Youth in Agriculture (ARYA)**, young farmers are trained in agri-entrepreneurship and value-added services.
- **Gender-Sensitive Extension:** Ensuring that at least 30% of beneficiaries in extension programs are women, as per ATMA guidelines.
- **Nutrition-Sensitive Agriculture:** Extension must integrate dietary diversity, home gardens, and biofortification to improve household nutrition.
- **Market Linkages:** Strengthening research-extension-farmer-market (REFM) linkages ensures that technologies are profitable, scalable, and relevant to farmers' real-world challenges.

7. Conclusion

India's experience in reforming its agricultural extension system showcases the potential of **institutional innovation, decentralization, and stakeholder convergence**. While challenges persist, models like ATMA, KVKs, ICT-led advisories, and participatory initiatives like Farmer FIRST are paving the way for a **resilient, inclusive, and sustainable agricultural ecosystem**. As India advances toward its SDG goals and faces the climate crisis, revitalizing extension remains a national priority—not just to improve productivity, but to empower people.

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