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Integrated and Pluralistic Approach as Innovative Extension Approaches to promote Nano DAP Liquid in Jalaun District of Uttar Pradesh

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Introduction

Indian agriculture is witnessing a paradigm shift towards input efficiency, sustainability, and climate-resilient practices. Among various innovations introduced in recent years, nano-fertilizers represent a significant breakthrough in nutrient management. Nano DAP Liquid, developed by the Indian Farmers Fertiliser Cooperative Limited (IFFCO), is one such innovation that aims to enhance nutrient use efficiency while reducing dependency on conventional chemical fertilizers. The product was officially registered under the Fertilizer Control Order (FCO) and came into commercial use from 2 March 2023.

However, the success of any technological intervention in agriculture largely depends not only on its scientific merit but also on its acceptance by farmers. This acceptance, in turn, depends on the effectiveness of extension strategies adopted for dissemination. In this context, the experience of Jalaun district of Uttar Pradesh provides an excellent example of how an integrated and pluralistic extension approaches, led by the Krishi Vigyan Kendra (KVK) to support IFFCO and other stakeholders, resulted in large-scale adoption of Nano DAP within a short span of time. The present article documents the process, strategies, and outcomes of this innovative extension initiative, highlighting the pivotal role played by KVK Jalaun in coordinating scientific outreach,

farmer engagement, and institutional convergence.

Jalaun district holds a significant position in the agricultural landscape of Bundelkhand region. The district is widely recognized as a major hub of vegetable pea and field pea cultivation, with nearly 65,000 hectares under pea cultivation annually. Apart from peas, crops such as wheat, lentil, gram, urd, and oilseeds form the major cropping system of the region.

Despite the progressive nature of farmers in the district, fertilizer use has traditionally remained dominated by conventional chemical fertilizers, particularly DAP. The dependency on bagged fertilizers, limited awareness about new formulations, and risk perception associated with innovative products were key constraints in introducing alternative nutrient management technologies. Therefore, when Nano DAP was introduced, the response from farmers was initially cautious and hesitant.

Nano DAP Liquid: A Technological Innovation

Nano DAP Liquid contains 8 percent nitrogen and 16 percent phosphorus in nano form, enabling nearly 90 percent nutrient use efficiency. Unlike conventional fertilizers, which suffer losses due to leaching, fixation, and volatilization, Nano DAP ensures rapid absorption and effective utilization by plants. A single 500 ml bottle of Nano DAP, priced at ₹600, is capable of covering a large area when used as seed treatment or foliar spray.

Despite these advantages, farmers initially found it difficult to accept the concept that such a small quantity could replace bulky fertilizer bags. This perception gap emerged as the biggest challenge in its adoption.

Need for an Innovative Extension Approach

The introduction of Nano DAP in Jalaun revealed that conventional extension methods alone would not be sufficient to ensure adoption. Farmers needed visual proof of performance, scientific explanation in simple language, repeated interactions with experts, Assurance from trusted institutions, Support from local organizations

Recognizing these needs, KVK Jalaun and IFFCO, designed and implemented an integrated and pluralistic extension approach that combined scientific validation, participatory learning, and

institutional coordination.

Integrated and Pluralistic Approach under Innovative Extension Approach

Krishi Vigyan Kendra played a supportive role in planning, coordinating, and executing the extension strategy as a public sector unit with district administration. As a frontline extension institution, KVK acted as a bridge between research organizations, input agencies, administration, and farmers. IFFCO and PACS as a cooperative organisation to provide timely availability of quality fertilizer to the farming community. Also the other stakeholders also provided the support and Digital technologies included for wider dissemination. The intervention began with the establishment of a demonstration unit at the KVK farm in 2025. This demonstration served as a live laboratory where farmers could observe the performance of nano DAP under local agro-climatic conditions. The visual impact of healthy crop growth and improved vigor created curiosity and initiated discussion among visiting farmers.

Selection of Villages and Farmer Groups

To ensure wider outreach, eight villages were identified for focused intervention, namely Baragaon, Bhuwa, Imiliya, Chamari, Akodi, Mandri, Kakhara, and Ata. These villages were selected based on cropping intensity, presence of progressive farmers, and accessibility for extension activities. In each village, key farmers were identified and involved as early adopters. These farmers played a crucial role in influencing peer groups and acted as local ambassadors of the technology. Their fields were used as demonstration sites, which significantly enhanced the credibility of the intervention.

Integrated Extension Activities and Capacity Building

The extension strategy adopted was holistic and participatory in nature. Instead of relying on a single method, the interpersonal, group-based, and mass extension approaches adopted. Farmers were engaged through regular village-level meetings, field visits, and interactive sessions. Scientists explained the scientific basis of Nano DAP, its application method, and its advantages over conventional fertilizers. Special emphasis was laid on addressing farmer doubts regarding dosage, cost-effectiveness, and compatibility with existing cropping systems.

In addition, digital tools such as WhatsApp groups, short videos, and advisory messages were used to strengthen communication. This helped in reaching a larger number of farmers and ensured continuous engagement throughout the cropping season.

Role of IFFCO and PACS in Strengthening Adoption

IFFCO played a critical role by ensuring timely availability of Nano DAP and providing technical support during demonstrations. The involvement of Primary Agricultural Credit Societies (PACS) further strengthened the extension network. PACS served as local hubs for product availability, farmer guidance, and feedback collection.

Farmers–Scientists Interaction and Administrative Support

A major highlight of the extension effort was the organization of Farmers–Scientists Interaction (FSI) programmes and Goshti at the district level. These interactions were conducted under the chairmanship of the District Magistrate, which added administrative strength and visibility to the initiative.

During these programmes, farmers directly interacted with scientists, extension officials, and IFFCO representatives. Their queries were addressed scientifically, and successful farmers shared their experiences. Such interactions not only improved technical understanding but also created a sense of collective ownership among stakeholders.

Impact and Outcomes

The integrated and pluralistic extension approach yielded remarkable results. Within a short period, adoption of Nano DAP increased significantly across the district. As per IFFCO records, nearly 36,000 bottles of Nano DAP were sold, covering approximately 30,000 hectares, mainly for seed treatment in pea and pulse crops.

The adoption rate increased by nearly 80 percent compared to the initial phase. Farmers reported improved crop establishment, better root development, and visible improvement in crop vigor. Many farmers also acknowledged the convenience and cost-effectiveness of the product.

The success of this initiative demonstrated that when scientific innovation is supported by systematic extension efforts and institutional convergence, adoption barriers can be effectively

overcome.

Conclusion

The experience of Nano DAP promotion in Jalaun district clearly demonstrates that technological innovation alone is not sufficient for agricultural transformation. The success lies in how effectively the technology is communicated, demonstrated, and supported at the field level.

The integrated and pluralistic extension approach administered by KVK Jalaun, to coordinate with IFFCO, PACS, and district administration, proved to be a highly effective model. The approach combined scientific validation, farmer participation, institutional convergence, and continuous capacity building, resulting in large-scale adoption of Nano DAP.

This model serves as a replicable framework for promoting new agricultural technologies across the country. The initiative not only enhanced nutrient management practices but also strengthened the role of KVKs as catalysts of agricultural innovation.

Way Forward

The success achieved in Jalaun provides a strong foundation for scaling up Nano DAP adoption in other districts. Future efforts should focus on strengthening farmer field schools, integrating digital advisory platforms, and conducting long-term impact assessments on soil health and crop productivity. With continued collaboration among research institutions, extension agencies, and farmers, Nano DAP has the potential to contribute significantly to sustainable and climate-smart agriculture in India.