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Market analysis of gromor nano dap in Telangana

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Abstract

Aim of the Study: The study aimed to analyze the cropping patterns and usage behavior of Nano DAP among farmers in Warangal district, Telangana. Specifically, it focused on understanding the seasonal, crop-wise, and method-wise adoption of Nano DAP, adherence to recommended dosage, extent of replacement of conventional DAP, and integration with other agro-chemicals.

Study Design, Area and Duration: The research adopted a descriptive study design to record farmers' experiences and usage behavior without altering variables. It was conducted during the agricultural year 2024- 25 in Warangal district of Telangana, a major agricultural hub with diverse crops and active fertilizer markets. Five mandals- Narsampet, Geesugonda, Duggondi, Parkal, and Atmakur, were purposively selected due to higher adoption of Nano DAP.

Methodology: A total of 80 farmers using Nano DAP were purposively selected from 10 villages across the five mandals (8 farmers per village). Data were collected using a structured and pre-tested questionnaire through personal interviews. The questionnaire captured details on seasonal usage, different crops of application, methods of application (spray or drip), dosage adherence, and extent of replacement of conventional DAP. Information on integration with other agro-chemicals was also gathered. Responses were tabulated and analyzed using simple averages and percentages to clearly highlight usage patterns.

Results: The findings revealed distinct patterns of Nano DAP adoption. A majority of farmers (52.5%) used Nano DAP in Kharif, 28.75 percent in Rabi, and 18.75 percent across both seasons. Crop-wise, adoption was highest in cotton (28.75%), followed by paddy (25%) and maize (22.5%), chilli (10%) and other crops such as banana, turmeric, and vegetables (13.75%) the usage of nano DAP was low. In terms of application, 50 percent applied Nano DAP at the second spray stage, 31.25 percent at the first spray, and 18.75 percent adopted both sprays, while 18.75 percent reported using it through drip fertigation. All respondents adhered to the recommended dosage of 1 litre per acre. With respect to replacement, 37.5 percent had fully substituted conventional DAP, while 62.5 percent used it partially. Integration patterns showed that 40 percent of farmers mixed Nano DAP with other agro-chemicals, whereas 60 percent applied it independently. These results indicate that Nano DAP is gaining strong acceptance among farmers, particularly in major crops, though complete replacement of traditional DAP is still evolving.

Keywords: Nano DAP, usage pattern, cropping pattern, foliar application, drip fertigation, dosage adherence, conventional DAP replacement, integrated nutrient management, farmer perception, sustainable agriculture

1. Introduction

Fertilizers are defined as any material organic or inorganic, natural or synthetic that supplies one or more essential nutrients required for plant growth. Fertilizers are Broadly categorized into organic and inorganic types, chemical or commercial fertilizers, have played a pivotal role in increasing agricultural productivity across India. Over the past five decades, a strong correlation has been observed between the rise in fertilizer usage and increased crop yields in almost every state. While multiple factors like seed quality, irrigation, pest control, and climate affect agricultural output, the role of fertilizers in supplying essential macro- and micronutrients remains crucial. Given the limited scope for expanding cultivable land and the widespread nutrient deficiencies in Indian soils, fertilizers are indispensable for sustaining and improving crop yields.

1.1 Current Status and Growth Trends of the Indian Fertilizer Market (2023 2032)

India is the world's second-largest fertilizer user and ranks third in total fertilizer production, holding the second position in nitrogen and phosphate fertilizer output. In 2023, India's fertilizer market reached a valuation of INR 942.1 billion, and is projected to grow to INR 1,383.8 billion by 2032, reflecting a steady Compound Annual Growth Rate of 4.37 percent. Present the market expansion is driven by the country's rising population, rapid urbanization, and increasing food demand, which together necessitate higher agricultural productivity and soil fertility management. Supplementing this demand are improved rural incomes and enhanced access to agricultural credit, which enable farmers to invest more in fertilizers.

1.2 Fertilizer production in India In the fiscal year 2023-24

India's fertilizer production witnessed notable shifts across key nutrients. Urea output surged to 31.41 million tonnes, marking a robust 10.2 percent annual rise, while DAP production slightly declined by 1.2 percent to 4.29 million tonnes. Production of single super phosphate (SSP) declined sharply by 21.5 percent, reaching 4.43 million tonnes. This reflects a production base dominated by nitrogenous fertilizers with urea accounting for the majority while phosphatic fertilizers experienced downward pressure. The disparity underlines India's ongoing challenges maintaining balanced nutrient availability amid varying production dynamics for urea, phosphates, and other fertilizers.

1.3 Fertilizer consumption in India in the fiscal year 2023-24

India's total fertilizer consumption surged to 64.84 million tonnes, marking a 1.6 percent increase over the previous year. Nutrient consumption ($N + P_2O_5 + K_2O$) also climbed 2.7 percent, reaching 30.64 million tonnes, nitrogen at 20.46 million tonnes, phosphorus pentoxide at 8.31 million tonnes, and potassium oxide at 1.88 million tonnes. By product category, urea consumption increased up to 35.78 million tonnes, DAP to 10.81 million tonnes, MOP to 1.64 million tonnes, while NP/NPK complexes recorded 11.07 million tonnes and SSP declined to 4.54 million tonnes. Reflecting strides toward balanced use, the national NPK ratio improved from 11.8:4.6:1 in 2022-23 to 10.9:4.4:1 in 2023-24, and nutrient application intensity rose from 136.2 kg/ha to 139.8 kg/ha. This evolving consumption profile underlines a growing trend towards integrated nutrient management and enhanced fertilizer efficiency in India's agricultural practices.

1.4 Fertilizer Imports by India

Despite significant improvements in domestic fertilizer production, India continues to depend on imports to meet its total demand. As per the Annual Review of Fertilizer Production and Consumption 2023-24 and the Economic Survey 2023 24, nearly 30 percent of India's fertilizer needs are met through imports. In nutrient terms, during the year 2023-24, India imported 4.575 million metric tonnes (MMT) of Nitrogen (N), 3.046 MMT of Phosphate (P_2O_5), and 2.019 MMT of Potash (K_2O). This marked a decline of 10.3 percent in nitrogen and 16.1 percent in phosphate imports, while potash imports increased by 41.1 percent over 2022-23. The overall NPK nutrient imports declined from 10.16 MMT in 2022-23 to 9.64 MMT in 2023 24, indicating India's increasing emphasis on self-reliance through enhanced domestic production and balanced fertilizer use. Additionally, during 2024, fertilizer imports fell to 23.54 MMT, compared to 25.56 MMT during the same period in 2023, largely due to higher indigenous output. Notably, Russia became a key supplier, exporting around 2.8 MMT of nitrogen-based fertilizers to India in 2024, which constituted nearly 24.5 percent of India's total fertilizer imports. This trend reflects India's strategic shift towards diversifying its import sources while improving production efficiency domestically.

2. Methodology

The present study was conducted in Warangal district of Telangana state during the agricultural year 2024- 25. A descriptive research design was employed to assess the usage pattern of Nano DAP among farmers. Warangal was purposively selected due to its strong agricultural base, diverse cropping systems, and higher adoption of Nano DAP. Within the district, five mandals- Narsampet, Geesugonda, Duggondi, Parkal, and Atmakur were chosen for their intensive cultivation and active input markets. From each mandal, two villages were selected, making a total of 10 villages. Using purposive sampling, 80 farmers (8 from each village) who had prior experience in using Nano DAP were included in the study. To capture distribution and marketing perspectives, 20 dealers (four from each mandal) were also surveyed.

Primary data were collected through a structured and pre-tested questionnaire administered by personal interviews. The questionnaire focused on seasonal usage, crop-wise application, methods of application (foliar spray or drip fertigation), adherence to recommended dosage, extent of replacement of conventional DAP, and integration with other agro-chemicals. Secondary data were obtained from government offices, company records, and published sources to supplement field information.

The collected data were tabulated and analyzed using simple averages and percentages to identify adoption trends and usage behavior. Tabular analysis was used for presenting results systematically, while descriptive statistics provided clarity on usage pattern across different crops and seasons.

3. Results and Discussion

3.1 Seasonal Usage of Nano DAP

The findings indicated that more than half of the respondents (52.5%) reported using Nano DAP predominantly during the Kharif season, while 28.75 percent adopted it in the Rabi season. A further 18.75 percent of farmers applied Nano DAP across both seasons, reflecting its consistent adoption in multiple cropping cycles. The preference for Kharif can be attributed to higher cropping intensity and nutrient demand, particularly for paddy, cotton, and maize, which are dominant crops in the study area. This pattern suggests that farmers recognize Nano DAP as an effective input during periods of peak nutrient requirement.

3.2 Crop-Wise Usage of Nano DAP

The adoption of Nano DAP varied across crops. Cotton recorded the highest usage at 28.75 percent, followed by paddy (25%) and maize (22.5%). Chilli accounted for 10 percent of usage, while 13.75 percent of respondents applied Nano DAP to other crops such as banana, turmeric, and vegetables. The higher adoption in cotton and paddy highlights farmers' confidence in the product's role in improving nutrient absorption and yield in commercially important crops. Meanwhile, its use in horticultural and spice crops indicates its gradual diffusion beyond staple crops, aligning with diversification trends in the district.

3.3 Application Methods

The most common method of application was through foliar spraying, with 50 percent of respondents using Nano DAP

during the second spray stage at pre-flowering, while 31.25 percent applied it during the first spray at the vegetative stage. Around 18.75 percent adopted both sprays, reflecting a more integrated nutrient management approach. Additionally, 18.75 percent of farmers reported applying Nano DAP through drip fertigation, suggesting a gradual shift towards precision agriculture practices. The preference for later-stage sprays highlights farmers' belief in the efficiency of Nano DAP during critical nutrient uptake periods.

3.4 Dosage Adherence and Replacement of Traditional DAP

A notable result was the complete adherence of all farmers (100%) to the recommended dosage of One litre per acre as prescribed by Coromandel, which reflects high trust in company advisories. Regarding replacement trends, 37.5

percent of the respondents had fully replaced conventional granular DAP with Nano DAP, while 62.5 percent adopted it partially. This demonstrates that while a significant share of farmers is transitioning fully towards Nano DAP, the majority remain in an intermediate phase, often combining both fertilizers to balance cost, risk, and yield considerations.

3.5 Integration with Other Agro-Chemicals

The study further revealed that 40 percent of farmers used Nano DAP in combination with other inputs such as nano urea, micronutrients, and pesticides. This integrated usage highlights farmers' efforts to optimize input efficiency and reduce labor costs. However, the majority (60%) preferred independent application, likely due to concerns over compatibility or following extension recommendations

Table 1: Consolidated usage pattern of Nano DAP among farmers (n=80)

Parameter	Category	Respondents (n)	Percentage (%)
Season of usage	Kharif	42	52.50
	Rabi	23	28.75
	Both seasons	15	18.75
Crop-wise usage	Cotton	23	28.75
	Paddy	20	25.00
	Maize	18	22.50
	Chilli	8	10.00
	Other crops	11	13.75
Application method	First spray	25	31.25
	Second spray	40	50.00
	Both sprays	15	18.75
	Drip irrigation	15	18.75
Dosage adherence	Followed recommendation	80	100.00
	Not followed	0	0.00
Replacement of traditional DAP	Fully replaced	30	37.50
	Partially replaced	50	62.50
Integration with other inputs	Used with agro-chemicals	32	40.00
	Used independently	48	60.00

4. Conclusion

The study on the usage pattern of Nano DAP in Warangal district revealed that farmers are increasingly adopting this innovative fertilizer, particularly during the Kharif season and in major crops such as cotton, paddy, and maize. Foliar spraying at critical growth stages emerged as the dominant method of application, with all farmers adhering to the recommended dosage of 1 litre per acre. This reflects not only a high level of awareness but also confidence in the product's effectiveness. The findings also highlight that while a significant share of farmers have fully replaced conventional DAP with Nano DAP, the majority continue to use it partially, indicating a gradual transition rather than an immediate shift.

Overall, the results suggest that Nano DAP is steadily establishing itself as a viable alternative to conventional fertilizers. Its adoption across diverse crops, integration with other agro-chemicals, and uptake through modern practices such as drip fertigation point to its growing role in sustainable nutrient management. However, the continued partial reliance on conventional DAP emphasizes the need for further awareness campaigns, field demonstrations, and extension support to build farmer confidence in complete substitution. Strengthening these efforts can accelerate Nano

DAP adoption, contributing to enhanced fertilizer efficiency, reduced input costs, and environmentally sustainable agriculture.

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