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### Satisfaction of black gram cultivation farmer with secondary nutrients and factors influencing their purchase decision in Konaseema district of Andhra Pradesh

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#### Abstract

This study investigates the satisfaction levels of Black gram cultivation farmers with secondary nutrients and the factors influencing their purchase decisions in the Konaseema district of Andhra Pradesh. Analysis reveals that most farmers are aware of secondary nutrients, with 90% familiar with these products, and express high satisfaction with their usage. Socio-economic characteristics, such as age, education, and landholding size, significantly impact adoption patterns. Calcium is the most utilized secondary nutrient, while Magnesium and Sulphur are used less frequently, indicating a need for improved education on their benefits. Price, quality, and brand reputation are key factors influencing purchase decisions. Recommendations include targeted educational campaigns, subsidized programs, and enhanced distribution channels to improve adoption and agricultural productivity. This study highlights the potential for increased secondary nutrient usage to boost crop yields and support sustainable agriculture in the region.

**Keywords:** Black gram cultivation, secondary nutrients, farmer satisfaction, adoption patterns, socio-economic factors

#### 1. Introduction

Agriculture is a cornerstone of India's economy, providing livelihoods for over half the population and contributing significantly to the Gross Value Added (GVA). Beyond its economic impact, agriculture ensures food security and sustains rural communities. Soil health, which includes productivity, resilience, and sustainability, is vital for long-term agricultural success and relies on a balanced supply of essential nutrients. (Organica Biotech, 2023) <sup>[4]</sup>.

While primary nutrients like Nitrogen (N), Phosphorus (P), and Potassium (K) are well-recognized for their roles in plant growth, secondary nutrients such as Sulphur (S), Calcium (Ca), and Magnesium (Mg) are equally important. They support various physiological processes, including protein synthesis and chlorophyll formation. Despite their benefits, secondary nutrients often receive less attention, leading to widespread deficiencies that impact crop yields and soil quality (Scherer, 2001) <sup>[5]</sup>.

Secondary nutrients like Calcium (Ca), Magnesium (Mg), and Sulphur (S) are essential for soil health and plant growth, playing key roles in processes such as enzyme activation, protein synthesis, and photosynthesis (Jones *et al.*, 2013; Marschner, 2012). Despite their importance, these nutrients often receive less attention than primary nutrients

(N, P, K), leading to deficiencies that can negatively impact crop yields and soil quality. For example, Sulphur deficiency can impair chlorophyll formation and nitrogen fixation, especially in legumes (Scherer, 2001) <sup>[5]</sup>. Addressing these deficiencies is crucial for sustainable agriculture, as adequate levels of secondary nutrients enhance primary nutrient efficiency and improve crop resilience to environmental stresses (Kaur & Singh, 2020) <sup>[2]</sup>. Moreover, sufficient Calcium, Magnesium, and Sulphur levels contribute to better soil structure and fertility, preventing compaction and acidification (Tisdale *et al.*, 1993) <sup>[6]</sup>. Thus, balanced nutrient management, including the proper application of secondary nutrients, is vital for achieving high agricultural productivity and long-term soil sustainability.

In India, secondary nutrient usage is rising, especially in states like Punjab, Haryana, Tamil Nadu, and Andhra Pradesh, reflecting increased awareness and the influence of government initiatives. However, challenges such as a lack of awareness, inadequate fertilizer formulations, economic constraints, and environmental factors hinder widespread adoption. In Andhra Pradesh, the consumption of secondary nutrients remains below recommended levels, contributing to soil imbalances and reduced crop yields.

This study investigates secondary nutrient usage patterns and farmers' satisfaction with these nutrients in the Konaseema district of Andhra Pradesh. By analyzing factors influencing farmers' purchase decisions and perceptions, the research aims to identify strategies to enhance the adoption of secondary nutrients, improve agricultural productivity, and support sustainable farming practices in the region.

## 2. Materials and Methods

The study employed a survey method, involving 75 Black gram farmers from Konaseema district. Data was collected on socio-economic characteristics, awareness, usage patterns, satisfaction levels, and factors influencing their purchase decisions. The survey included questions on landholding size, education level, income, awareness of secondary nutrients, sources of information, usage practices, and satisfaction with the results of using secondary nutrients. Rating scale, tabular analysis and percentage analysis were used to analyze the data.

## 3. Results and Discussion

### 3.1 Socio-Economic Characteristics of Farmers in the Study Area

Understanding the socio-economic characteristics of farmers in the Konaseema district is crucial for analyzing their behavior and decision-making processes regarding agricultural practices. This section examines the age, education level, landholding size, awareness about secondary nutrients, usage patterns, satisfaction levels, and factors influencing the purchase of secondary nutrients among Black gram farmers.

### 3.2 Age of the Respondents

Age plays a significant role in farmers' decision-making abilities, influencing their risk-taking behavior and openness to adopting new technologies. Table 3.1 presents the age distribution of 75 sampled farmers:

**Table 1:** Age of the respondents among farmers

S. No.	Age Group (Years)	No. of Farmers	Percentage (%)
1	20-30	12	16
2	30-40	27	36
3	40-50	20	27
4	50 and above	16	21
	Total	n = 75	100

### 3.3 Educational Status of the Respondents

Education plays a pivotal role in the adoption of new agricultural technologies. The educational status of the farmers is detailed in Table 3.2:

**Table 2:** Educational status of sample farmers in selected districts

S. No.	Educational Status	No. of Farmers	Percentage (%)
1	Illiterate	5	6.7
2	1st to 7 <sup>th</sup>	10	13.3
3	8th to 10 <sup>th</sup>	20	26.7
4	Intermediate	25	33.3
5	Graduate and above	15	20
	Total	75	100

### 3.4 Landholding Particulars of the Respondents

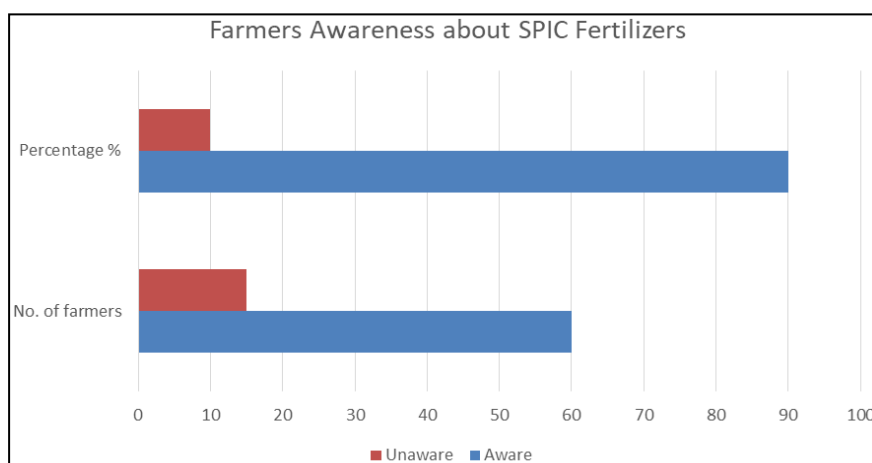
Landholding size is another vital socio-economic characteristic, affecting the farming practices and decision-making of the respondents. The landholdings among farmers in the Konaseema district are outlined in Table 3.3:

**Table 3:** Land holdings of respondents

S. No	Category	No. of farmers	Area Under Cultivation (ha)
1	Marginal (<1 ha)	15	16
2	Small (1-2 ha)	30	55
3	Medium (2-4 ha)	20	170
4	Large (>4 ha)	10	150
	Total	75	391

The survey categorizes the 75 farmers based on their landholding sizes. Marginal farmers cultivate 16 hectares, averaging 1.07 hectares per farmer. Small farmers manage 55 hectares, averaging 1.83 hectares per farmer. Medium farmers oversee 170 hectares, with an average of 8.5 hectares per farmer, while large farmers farm 150 hectares, averaging 15 hectares per farmer. The majority of cultivated land is managed by medium and large farmers, indicating a diverse agricultural landscape with varying scales of operations.

### 3.5 Awareness about Secondary Nutrients among Farmers



**Fig 1:** Awareness about secondary nutrients among farmers

The survey assessed the awareness of secondary nutrients among 75 farmers in the Konaseema district. Results indicate that a significant majority, 90%, are familiar with secondary nutrient products, while only 10% lack awareness. This highlights a relatively small portion of the farming community that may require additional education

and outreach regarding the benefits of secondary nutrients.

### 3.6 Analysis of Secondary Nutrient Usage in Black Gram Cultivation

Secondary nutrients such as Calcium, Magnesium, and Sulphur play essential roles in Black gram cultivation. The usage patterns of these nutrients are presented below:

**Table 4:** Usage pattern of Secondary Nutrients by small, medium and large farmers

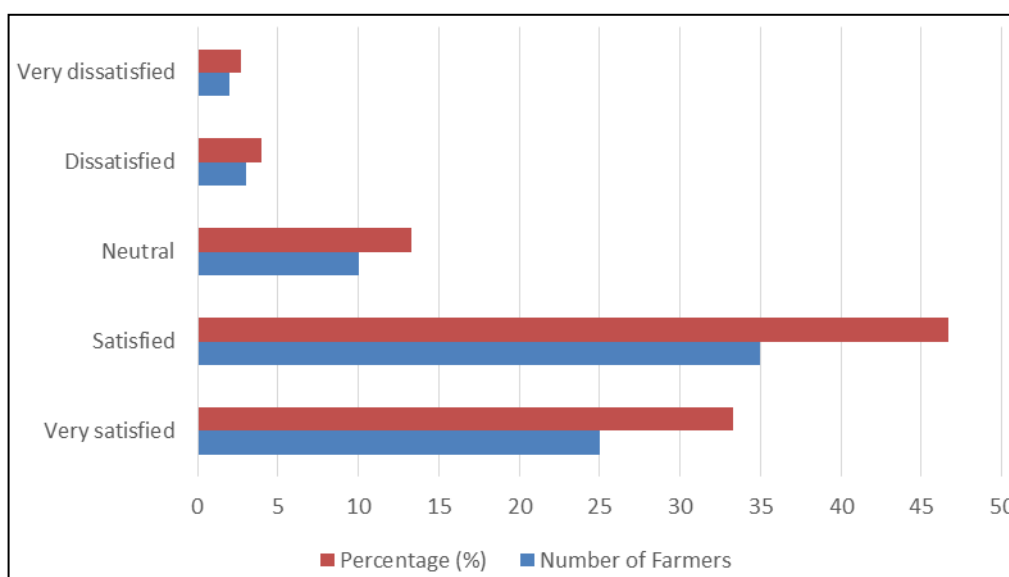
S. No.	Secondary nutrients	Average usage pattern of secondary nutrient (%)
1.	Calcium	50-60%
2.	Magnesium	10-20%
3.	Sulphur	30-35%

The data reveals that Calcium is the most significant secondary nutrient used in Black gram cultivation, while Magnesium and Sulphur are used in lesser quantities. This underscores Calcium's critical role in soil fertility and crop nutrition and suggests potential areas for increased usage of Magnesium and Sulphur to further enhance agricultural

productivity.

### 3.7 Satisfaction Levels of Farmers Regarding Secondary Nutrients

The study found that the majority of farmers in Konaseema District view secondary nutrients positively, as detailed below:



**Fig 2:** Satisfaction of respondents with regard to effectiveness of secondary nutrients in Black Gram Cultivation.

- Very Satisfied: 33.33%
- Satisfied: 46.67%
- Neutral: 13.33%
- Dissatisfied: 4%
- Very Dissatisfied: 2.67%

These results indicate that most farmers recognize significant benefits in using secondary nutrients for Black gram. However, some neutral or dissatisfied respondents may experience mixed results or improper application.

### 3.8 Factors Influencing Farmers' Choice of Secondary Nutrient Brands

A survey of 60 respondents identified key factors influencing brand choice for secondary nutrients in Black gram cultivation. These include: Price emerged as the primary consideration for 45.33% of respondents, emphasizing cost-effectiveness. Quality was crucial for 30.67%, followed by brand reputation (14.67%).

Availability and other factors, like customer service or environmental impact, played lesser roles. These findings underscore economic and quality-driven parameters influencing farmers' purchase decisions of secondary nutrients.

**Table 4:** Factors influencing farmers to choose a particular brand of secondary nutrients for your black gram cultivation

S. No.	Factors	Number of Respondents	Percentage
1.	Price	27	45.33 percent
2.	Quality	18	30.67 percent
3.	Brand Reputation	9	14.67 percent
4.	Availability	5	8 percent
5.	Others (Specify)	1	2.67 Percent
	Total		100 Percent

### 4. Conclusion

Based on the study conducted in the Konaseema district of Andhra Pradesh, it is evident that Black gram cultivation

farmers exhibit a high level of awareness and satisfaction with secondary nutrients, with 90% of the respondents familiar with these products and a significant majority expressing satisfaction with their use. Most farmers in the region are middle-aged and possess a reasonable level of education, suggesting a readiness to adopt new agricultural practices. However, usage patterns show a pronounced preference for Calcium over Magnesium and Sulphur, indicating a need for further education on the benefits of a more balanced application of secondary nutrients. Farmers prioritize price when choosing secondary nutrient brands, followed by quality and brand reputation. This indicates that cost-effective solutions and quality assurance are crucial for broader adoption. While the majority of farmers are satisfied or very satisfied with secondary nutrients, a small portion remains neutral or dissatisfied, possibly due to improper application techniques or varying soil conditions. To enhance the adoption and effectiveness of secondary nutrients, it is recommended to implement educational campaigns, subsidized programs, and improved distribution channels to make these products more accessible and affordable. In conclusion, by addressing these factors, the Konaseema district can achieve significant advancements in agricultural productivity and sustainability, ultimately leading to a more resilient and prosperous farming community.

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