**RESEARCH ARTICLE**

**Effect of Various Integrated Nutrient Management Practices in the Yield of
Green Gram (*Vigna radiata* L.)**

D. Jeevitha[1]\*, S. Sanjana[2] and M. Arthy [3]

1&2 - Final year student of Nalanda College of Agriculture, Tiruchirapalli - 621104

3 - Department of Agronomy, Nalanda College of Agriculture, Tiruchirapalli - 621104

**\*Corresponding Author’s mail id -** jeevitha2456@gmail.com

**ABSTRACT**

Field experiment was conducted at Nalanda college of Agriculture, Trichy, during
June - August, 2025 to study of different nutrient management practices on green gram. The treatments comprised of Control (T1), 100 % Recommended Dosage of Fertilizer (T2),
75% Recommended Dosage of Fertilizer + 25% FYM @ 1 ton ha-1 (T3), 50% Recommended Dosage of Fertilizer + 25% FYM @ 1 ton ha-1 (T4), 50% Recommended Dosage of
Fertilizer + Foliar application of Pulse wonder @ 5 kg ha-1 (T5), 75% Recommended Dosage of Fertilizer + 25% Vermicompost @ 2 tons ha-1 (T6) and 50% Recommended Dosage of Fertilizer + 25% Vermicompost @ 2 tons ha-1 (T7). The experiment was laid out in randomized block design with three replications. Farmyard manure, Vermicompost, Recommended Dose of Fertilizer is applied basally and used in the treatments. The result revealed that among the different treatments imposed, application of 50% Recommended Dosage of Fertilizer + Foliar application of Pulse wonder @ 5 kg ha-1 recorded the highest growth attributes like plant height (37.88 cm), leaf area index (4.21), dry matter production (3542.76 kg ha-1), number of branches plant-1 (7.33), number of leaves plant-1 (27.8) and yield attributes like number of pods plant-1 (43), pod length (10.02 cm), number of
grains pod-1 (11), grain yield (613 kg ha-1), haulm yield (919.5 kg ha-1), Net return
(₹48719 ha-1) and BCR (2.47) . The lowest values were obtained under control.

**Keywords:** *Green gram; Pulse wonder; Farm Yard Manure; Vermicompost; Growth; Yield; BCR.*

**INTRODUCTION**

Pulses are one of the distinct health benefit food crops globally due to their low fat contain and higher protein content. Pulses are an important group of crops in India, which is also responsible for yielding large financial gains by amounting for a large part of the exports
(Anon *et al.,* 2022). India is one of the agricultural country and food is very important need for our country because growth of population (Vaithiyanathan and Sundaramoorthy, 2016). Green gram (*Vigna radiata* L.) is one of the most important and extensively cultivated pulse crops. India shares about 35- 37% and 27% of the total area and production of pulses, respectively in the world. Green gram commonly known as “mung” or “mung bean” is the most important crop of the South-East Asia and particularly the Indian subcontinent
(Ranpariya *et al.,* 2017). India is the largest producer and consumers of pulses in the world accounting for about 29% of the world area and 19% of the world's production. Even more importantly India is the largest importer and processor of pulses in the world. Fatefully, country's pulse production has been around 14-15 MT, coming from a near stagnated area
of 22 m ha. (Singh *et al.,* 2015). In India, area under green gram is 654 lakh hectares with a production of 599 lakh tonnes with productivity of 916 kg ha-1 (Joshi *et al.,* 2020). Integrated Nutrient Management (INM) is a comprehensive approach to managing nutrients for crops in a way that maximizes productivity while minimizing environmental impact. It combines the use of chemical fertilizers, organic manures, and other nutrient sources to ensure that plants receive the right amount of nutrients at the right time. It improves crop yields and soil health by efficiently using nutrients like chemical fertilizers, organic matter (like compost and manure), and crop residues. By reducing fertilizer costs and preventing soil degradation, Integrated Nutrient Management is a smart way to grow healthy crops, protect the environment, and save money. It combines traditional and modern methods to provide plants with the nutrients they need without overusing fertilizers, leading to sustainable agriculture.
 The present investigation aims to evaluate the impact of Integrated Nutrient Management (INM) practices on the growth, yield, and economics of green gram under the agro-climatic conditions of Trichy, Tamil Nadu. The study encompasses the use of chemical fertilizers and organic manures in different combinations to identify the most effective nutrient management practice. The findings are expected to provide scientific insights into nutrient use efficiency, soil fertility improvement, and sustainable production of green gram. By assessing both biological and economic responses, the study seeks to generate location-specific recommendations for farmers.

**MATERIALS AND METHODS**

The study focuses on the impact of various integrated nutrient management practices on the yield of Green gram (*Vigna radiata* L.) during Kharif season at Nalanda College of Agriculture, M. R. Palayam, Trichy. The experimental field was conducted from May to August 2025, with the site located at 10.08° N latitude and 77.64° E longitude and an altitude of 296 m above MSL. The climate of the experimental site is tropical zone, with a maximum temperature range of 33.1 ºC to 38.9 ºC, a minimum temperature range of 25.2 ºC to 27.4 ºC, and a mean annual rainfall range of 800 mm to 1000 mm. The soil characteristics of the experimental field were clay loam, with fertility status of 213.59 kg ha-1 in available nitrogen, 3.94 kg ha-1 in available phosphorus, and 502.14 kg ha-1 in available potassium.
Physical analysis revealed that the soil had a clay content of 55.12, silt of 33.00, and sand
of 10.45. Chemical analysis revealed that the available nitrogen was 213.49 kg ha-1, phosphorus was 3.94 kg ha-1, potassium was 502.14, organic carbon was 0.263, and the soil reaction pH was 8.34. The EC (1:2 soil water suspension) was 0.10.

The study focuses on the Green gram variety VBN 2. The experiment was conducted in a Randomized Block Design with three replications, with each treatment plot having dimensions of 5 m x 4 m. The treatments involved applying recommended doses of NPK, Vermicompost, FYM, and Pulse wonder in different combinations besides the control plot. The time of foliar spray of Pulse wonder was @ 28 DAS during flowering and the recommend dose of fertilizer was given through soil application @ 20:40:20 NPK kg ha-1.

Crop management practices included field preparation, basal application of nutrients, seed sowing, irrigation, gap filling and thinning, soil and foliar application of nutrients, hand weeding, plant protection, harvesting and threshing. The field was prepared by providing one ploughing and forming a check basin with specific dimensions and providing irrigation channels. VBN 2 variety seeds were used @ 20 kg ha-1 and sown at the spacing of
30 cm x 10 cm. The critical period for irrigation in green gram is the flowering and pod formation stages. Five samples in each plot were tagged randomly in each net plot for recording biometric observations like Plant height (cm), Number of branches plant-1, Number of leaves plant-1, Leaf Area Index, Dry Matter Production (kg ha-1), Number of pods plant-1, Pod length (cm), Number of seeds pod-1, Grain yield (kg ha-1), Halum yield (kg ha-1), Harvest Index, Benefit Cost Ratio.

 These experimental data were recorded and statistically analysed with the methods given by Gomez and Gomez (1984). The data showed high variation and hence the data are subjected to square root transformation √x+0.5 and analysed statistically. Wherever the results were found significant, the critical difference (CD) was worked out at a five percent probability level for a significant result. Non-significant comparison was indicated as ‘NS’.

**RESULTS AND DISCUSSION**

The results showed that integrated nutrient management practices significantly influenced plant height, branch number, leaf area index, dry matter production, and yield characteristics.

The highest plant height was recorded in the treatment (T5) 50% Recommended dose of fertilizer + Pulse wonder @ 5 kg ha-1, Dayana *et al.* (2022) also found similar results. It was followed by (T6) 75% Recommended dose of fertilizer + 25% Vermicompost @
2 tons ha-1. The lowest plant height was recorded under the control treatment (T1). The lowest number of leaves plant-1 was recorded in the control treatment (T1).

The leaf area index was also significantly influenced by the integrated nutrient management practices. The maximum leaf area index was recorded in the treatment (T5)
50% Recommended dose of fertilizer + Pulse wonder @ 5 kg ha-1,
Kamaleshwaran, R., & Karthiga, S. (2021) got similar results. Then followed by (T6) 75% Recommended dose of fertilizer + 25% Vermicompost @ 2 tons ha-1. The least leaf area index was recorded in the control treatment (T1).

The study also revealed that the integrated nutrient management practices significantly influenced the dry matter production in green gram. The maximum dry matter production was recorded in the treatment (T5) 50% Recommended dose of fertilizer + Pulse wonder @ 5 kg ha-1, Kunjammal, P., & Sukumar, J (2019) recorded similar results. Next followed by (T6) 75% Recommended dose of fertilizer + 25% Vermicompost @ 2 tons ha-1. The control treatment (T1) recorded the least dry matter production.

The study aimed to investigate the impact of integrated nutrient management practices on the growth and yield of green gram crops. The results showed that the application of a 50% recommended dose of fertilizer and pulse wonder at 5 kg ha-1 significantly influenced the number of pods plant-1, pod length, and seed pod-1 in green gram. The maximum pod length was recorded at the 45 DAS and harvest stage, while the minimum pod length was 6.13 cm. These results collaborate with the findings of Gupta *et al.* (2024) and
Krishnaveni *et al.* (2021).

The maximum number of seeds pod-1 was recorded at the harvest stage, with 11
seeds pod-1. Sundaralingam, K., & Vaideshwari, M. (2023) also obtained similar results. Test weight was not significantly different between the treatments.

The integrated nutrient management practices resulted in significant differences in grain yield, haulm yield, and harvest index. The maximum grain yield was 613 kg ha-1, while the minimum haulm yield was 354 kg ha-1 under the control treatment. The harvest index was statistically significant, with a range of 16.74 to 32.6 kg ha-1.

Nutrient uptake by the crop was significantly influenced by the integrated nutrient management practices. Nitrogen uptake was recorded at 58.70 kg ha-1, phosphorus uptake at 25.47 kg ha-1, and potassium uptake at 60.77 kg ha-1. The control treatment had the least phosphorus uptake at 2.82 kg ha-1.

**Table 1. Effect of various nutrient management practices on
growth parameters of Green gram**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Treatment Schedule** | **Plant height (cm)** | **No. of branches plant-1** | **No. of leaves plant-1** | **Leaf Area Index** | **Dry Matter Production (kg ha-1)** |
| T1 - Control | 21.93 | 3.6 | 16.07 | 2.67 | 904.32 |
| T2 - 100% RDF | 34.18 | 5.47 | 19.6 | 3.75 | 1465.76 |
| T3 - 75% RDF + 25% FYM @ 1t ha-1 | 30.04 | 4.54 | 18 | 2.97 | 1023.35 |
| T4 - 50% RDF + 25% FYM @ 1 t ha-1 | 28.67 | 4.38 | 16.6 | 2.82 | 987.05 |
| T5 - 50% RDF + Foliar application of pulse wonder @ 5 kg ha-1 | 37.88 | 7.33 | 27.8 | 4.21 | 3542.76 |
| T6 - 75% RDF + 25% Vermicompost @ 2 t ha-1 | 36.92 | 5.6 | 19.47 | 3.98 | 1943.98 |
| T7 - 50% RDF + 25% Vermicompost @ 2 t ha-1 | 32.89 | 5.36 | 19.2 | 3.58 | 1245.64 |
| S. Ed | 0.52 | 0.07 | 0.43 | 0.14 | 96.66 |
| C.D (P=0.05) | 1.16 | 0.16 | 0.95 | 0.05 | 212.95 |

**Table 2. Effect of various nutrient management practices on
yield parameters of Green gram**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Treatment Schedule** | **No. of pods plant-1** | **Pod length (cm)** | **No. of seeds pod-1** | **Grain yield (kg ha-1)** | **Halum yield (kg ha-1)** | **Harvest Index** | **Benefit Cost Ratio** |
| T1 - Control | 24.39 | 6.13 | 5.93 | 354 | 531 | 16.74 | 1.41 |
| T2 - 100% RDF | 40.75 | 8.25 | 9.71 | 552 | 828 | 27.28 | 1.96 |
| T3 - 75% RDF + 25% FYM @ 1t ha-1 | 36.52 | 8.01 | 8.18 | 481 | 721.5 | 23.85 | 1.67 |
| T4 - 50% RDF + 25% FYM @ 1 t ha-1 | 33.61 | 7.20 | 7.56 | 458 | 687 | 20.31 | 1.46 |
| T5 - 50% RDF + Foliar application of pulse wonder @ 5 kg ha-1 | 43.42 | 10.02 | 11.38 | 613 | 919.5 | 32.6 | 2.47 |
| T6 - 75% RDF + 25% Vermicompost @ 2 t ha-1 | 41.35 | 9.05 | 10.21 | 587 | 880.5 | 30.17 | 2.14 |
| T7 - 50% RDF + 25% Vermicompost @ 2 t ha-1 | 38.91 | 8.03 | 9.65 | 529 | 793.5 | 25.62 | 1.84 |
| S. Ed | 0.46 | 0.69 | 0.11 | 12.25 | 13.25 | 0.02 | NS |
| C.D (P=0.05) | 4.57 | 1.52 | 0.25 | 26.99 | 27.54 | 0.06 | NS |

**SUMMARY**

A field experiment was conducted at Nalanda College of Agriculture in Trichy district, Tamil Nadu, from June to August 2025 to study the effects of different nutrient management practices on green gram. The experiment was replicated three times with seven treatments: Control (T1), 100% Recommended Dosage of Fertilizer (T2), 75% Recommended Dosage of Fertilizer + 25% FYM @ 1 ton ha-1 (T3), 50% Recommended Dosage of Fertilizer + 25% FYM @ 1 ton ha-1 (T4), 50% Recommended Dosage of Fertilizer + Foliar application of Pulse wonder @ 5 kg ha-1 (T5), 75% Recommended Dosage of Fertilizer +
25% Vermicompost @ 2 tons ha-1 (T6), and 50% Recommended Dosage of Fertilizer + 25% Vermicompost @ 2 tons ha-1 (T7).

The results showed that integrated nutrient management practices significantly influenced growth characteristics of green gram. The application of 50% Recommended Dosage of Fertilizer + Foliar application of Pulse wonder @ 5 kg ha-1 (T5) recorded higher plant height, leaf area index (LAI), dry matter production (DMP), number of branches plant-1, and number of leaves plant-1. The control treatment (T1) recorded the least growth characters.

Integrated nutrient management practices also significantly influenced pod length, number of pods plant-1, and number of seeds pod-1 of green gram. The application of 50% Recommended Dosage of Fertilizer + Foliar application of Pulse wonder @ 5 kg ha-1 (T5) registered the maximum uptake of nitrogen, phosphorus, and potassium by the crop. The least uptake of nitrogen, phosphorus, and potassium was registered in the control treatment (T1).

In terms of economics, the application of 50% Recommended Dosage of Fertilizer + Foliar application of Pulse wonder @ 5 kg ha-1 (T5) recorded the maximum gross income,
net income, and BCR invested of ₹81843 ha-1, ₹48719 ha-1, and 2.47, while the least gross income, net income, and BCR were registered under the control treatment (T1).

**CONCLUSION**

Based on the result of the field experiment carried out in Nalanda college of Agriculture, Trichy district from June- August (2025). It can be concluded that the Integrated application of 50% Recommended Dosage of Fertilizer + Foliar application of Pulse wonder @ 5 kg ha-1 (T5) was performed very well and economic method for enhancing the grain yield of green gram. Application of Pulse wonder with inorganic fertilizer steadily supplies the nutrients which may be an economically viable method that can be recommended to the
green gram farmers for good yield and profit.

**ACKNOWLEDGMENT**

I am grateful to my guide, Mrs. M. Arthy, Assistant Professor and my advisor
Mr. V. Santosh, Assistant Professor. I am indebted for the support from all the teaching and non-teaching faculties of Nalanda College of Agriculture. Further, I express my gratitude to my dear friends Ms. R. Deepa, Ms. U. Dharshini, Ms. R. Divena and
Ms. M. Muthurajalakshmi for all the help they had rendered from the beginning till the end of the experiment.

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