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Shingade AC
M.Sc. (Agri.) Student, Department of Soil Science, College of Agriculture, Badnapur, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parabhani, Maharashtra, India

Shirale ST
Assistant Professor, AICRP on IFS, Department of Soil Science, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parabhani, Maharashtra, India

Gaikwad GK
Associate Professor, AICRP on Dryland Agriculture, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parabhani, Maharashtra, India

Ugile SK
Assistant Professor, Department of Soil Science, College of Agriculture, Badnapur, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parabhani, Maharashtra, India

Belge HA
M.Sc. (Agri.) Student, Department of Soil Science, College of Agriculture, Badnapur, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parabhani, Maharashtra, India

Corresponding Author:
Shingade AC
M.Sc. (Agri.) Student, Department of Soil Science, College of Agriculture, Badnapur, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parabhani, Maharashtra, India

Effect of different forms of fertilizers on growth, yield and economics of green gram (*Vigna radiata* L.)

Shingade AC, Shirale ST, Gaikwad GK, Ugile SK and Belge HA

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Abstract
A field experiment was conducted in the *kharif* season of 2024-25 at the Department of Soil Science, College of Agriculture, Badnapur to study the effect of different forms of fertilizers on growth, yield and economics of green gram (*Vigna radiata* L.). The experiment was laid out in a Randomized Block Design with six treatments: (T_1) Control (Without any fertilizer), (T_2) RDF (100%) through solid fertilizer 25:50:00 N:P:K Kg ha^{-1} + rhizophos, (T_3) RDF (75%) through solid fertilizer + rhizophos, (T_4) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of 19:19:19 @ 0.5% at 30 DAS, (T_5) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of nano urea @ 0.4% at 30 DAS and (T_6) RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS with four replications. The results indicated that the treatment (T_6) RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS recorded the highest plant height at harvest (73.27 cm), number of root nodules $plant^{-1}$ at harvest (33.41), number of pods $plant^{-1}$ (23.15), grain yield (1270.53 kg ha^{-1}), stover yield (2094.35 kg ha^{-1}). Economically, the highest gross monetary return (Rs 87192 ha^{-1}), net monetary return (Rs 36527 ha^{-1}) and benefit-cost ratio (1.72) were observed in the same treatment (T_6) RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS.

Keywords: Economics, foliar spray, green gram, growth, rhizophos, and yield

1. Introduction

Pulses, particularly legumes, are essential sources of protein and nutrients for a large portion of the global population, especially for vegetarians. In India, pulses contribute about 14% to the overall protein intake (Meena *et al.*, 2013) [12]. However, the demand for pulses continues to exceed production levels. The per capita availability of pulses has decreased from 60 grams in 1951 to 47 grams in 2014, falling short of the Indian Council of Medical Research's recommended 70 grams per person per day (Tiwari & Shivhare, 2016) [22]. This decline in availability has worsened malnutrition levels in India, underscoring the urgent need for improved pulse production to meet the nutritional demands of the growing population (Ghilotia *et al.*, 2018) [6].

To address this growing challenge, agricultural scientists are focusing on improving pulse crop yields through various soil treatments and management practices. Green gram (*Vigna radiata* L.), commonly known as mungbean, is a widely cultivated pulse that has been identified as an ideal candidate for boosting protein production. Renowned for its high digestibility, low gastrointestinal discomfort and unique flavor, mungbean holds a special place in Indian cuisine, often consumed as "Dal Moth" (Ninama *et al.*, 2022) [14].

With a protein content of 24.5%, along with notable concentrations of lysine, tryptophan and essential vitamins and minerals, mungbean stands out as a vital nutritional source (Ghilotia *et al.*, 2018) [6]. Moreover, its ability to fix atmospheric nitrogen and its short growth cycle make it ideal for intercropping systems, enhancing soil fertility and offering the added benefit of green manure (Pataczek *et al.*, 2018) [16]. Currently, India dedicates 5.13 million hectares to mungbean cultivation, yielding 3.08 million tons annually with an average yield of 601 kg per hectare (Department of Economic Statistics, 2021) [3]. States like Maharashtra, Andhra Pradesh and Rajasthan are key producers, with Maharashtra's Marathwada region seeing notable improvements in both yield and productivity (Anonymous, 2021-22) [1].

Despite these advancements, traditional intensive agricultural practices, which rely heavily on chemical fertilizers, contribute to escalating production costs and environmental pollution, hindering sustainable agricultural practices (Takeshima *et al.*, 2017; Islam *et al.*, 2022) [21, 7]. As a solution, foliar spray methods offer an efficient, cost-effective approach for delivering essential nutrients to crops during critical growth stages, improving nutrient absorption and crop productivity (Jamal *et al.*, 2006; Krishnasree *et al.*, 2021) [8, 9].

The application of foliar nutrition, which involves spraying essential nutrients directly onto the leaves, has shown promising results in improving mungbean productivity. Foliar spray allows for the rapid absorption of nutrients during critical growth phases, especially when soil nutrient availability is limited (Jamal *et al.*, 2006; Krishnasree *et al.*, 2021) [8, 9]. This method helps enhance photosynthesis, improve nutrient translocation and accelerate plant growth, leading to higher crop yields.

Soil health also plays a crucial role in pulse crop productivity. Traditional agricultural practices that rely heavily on chemical fertilizers not only increase production costs but also contribute to soil degradation and environmental pollution (Takeshima *et al.*, 2017; Islam *et al.*, 2022) [21, 7]. To address these challenges, the use of organic amendments and innovative fertilizers is becoming more prevalent. The application of bio-inoculants, such as *Rhizobium* spp. and *Phosphobacteria*, has been shown to improve nitrogen fixation and phosphorus availability in the soil, further promoting the growth of mungbean (Gajera *et al.*, 2014) [4]. In addition to bio-inoculants, the introduction of nano-urea and other specialized fertilizers offers a sustainable solution to nutrient deficiencies in soil. Nano-urea, developed by the Indian Farmers Fertilizer Cooperative (IFFCO), is a new-generation fertilizer that improves nutrient uptake efficiency and reduces the dependency on chemical fertilizers (Kumar *et al.*, 2021) [10].

The water-soluble source of phosphorus and nitrogen, Mono Ammonium Phosphate (MAP), contains 12 percent nitrogen and 61 percent P_2O_5. This composition makes it a high-quality source of phosphorus during various stages of the growth cycle. MAP is an optimal fertilizer for fertigation and foliar application, attributed to its high water solubility compared to DAP. This characteristic enhances the uptake of naturally occurring phosphorus in the soil. The presence of ammonium (NH^{4+}) in MAP contributes to a reduction in pH levels within the root zone soil, thereby facilitating improved phosphorus uptake by the plant (Phule and Raundal, 2022) [18].

By reducing the environmental impact of conventional fertilization methods, this method of of foliar application of fertilizer presents an environmentally sustainable way to enhance soil health and improve pulse crop yields.

2. Materials and Methods

2.1 Experimental site

The field experiment entitled "Effect of different forms of fertilizers on soil properties, yield and quality of green gram (*Vigna radiata* L.)" was conducted during the *kharif* season of 2024-25 at the experimental farm of the Department of Soil Science, College of Agriculture, Badnapur. The College of Agriculture, Badnapur is located at an elevation of 409 meters above mean sea level, positioned at a latitude of 19°50" and a longitude of 47°53" with a total altitude of 520 meters. The experimental field exhibited a clayey texture in its soil composition, with a measured pH level of 7.67, indicating a neutral acidity level. The sample exhibited organic carbon levels of 4.54 g kg^{-1} and available nitrogen measured at 141.18 kg N ha^{-1}. The analysis indicated available phosphorus measured at 15 kg P ha^{-1} and available potassium recorded at 589.78 kg K ha^{-1}. The crop received a total of 731.8 mm of rainfall throughout the duration of the experiment.

2.2 Experimental detail

After completion of preparatory tillage operations, the experimental units were laid out as per plan. The experiment was laid out in randomized block design (RBD) with six (6) treatments each replicated four times. The treatment comprises (T_1) Control (Without any fertilizer), (T_2) RDF (100%) through solid fertilizer 25:50:00 N:P:K Kg ha^{-1} + rhizophos, (T_3) RDF (75%) through solid fertilizer + rhizophos, (T_4) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of 19:19:19 @ 0.5% at 30 DAS, (T_5) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of nano urea @ 0.4% at 30 DAS and (T_6) RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00@ 0.5% at 30 DAS. Green gram seed variety BM-2003-2 was sown on June 20, 2024 by dibbling method as per randomly replicated plot having size 4.5 × 4 m^2 and 3.80 × 3.60 m^2 in gross and net plot respectively, maintained row to row spacing 30 cm and plant to plant 10 cm and using a seed rate of 15 kg ha^{-1}. During the sowing time, the complete recommended dosage of nitrogen and phosphorus (25:50 N and P_2O_5 kg ha^{-1}) was administered according to the treatment at 100% and 75% capacity, utilizing urea and SSP as the nutrient sources, respectively. Liquid biofertilizer, specifically Rhizophos, was applied on seed at a rate of 10.0 ml kg^{-1} in each treatment group, excluding the control. The water-soluble fertilizers (WSF) 19:19:19 and 12:61:00 NPK were dissolved in water to achieve a concentration of 0.5 percent (5 g/liter) and Nano urea is dissolved in water to achieve a concentration of 0.4 percent (4 ml/liter). These solutions were applied via spraying at 30 days post-sowing in accordance with the designated treatment schedule. To enhance the effectiveness of sprays, teepol was incorporated at a concentration of 0.5 ml per litre into the spray solution as a sticking agent. The crop was harvested at maturity stage by uprooting the plants and kept for sun drying on threshing floor for few days. After sun drying of harvested plants of net plot area are threshed. Five plants from each plot were randomly selected and used for recording biometric observations, the growth parameters *viz.* plant height (cm) at harvest and number of root nodules $plant^{-1}$. Yield attributing parameters *viz.* no. of pods $plant^{-1}$, grain yield (kg ha^{-1}) and stover yield (kg ha^{-1}), were recorded at harvest stage. Economic analysis of different treatments were also observed during the experiment. The data collected from the above observation were analysed statistically by the procedure prescribed by Panse and Sukhatme (1985) [15].

3. Results and Discussion

3.1 Effect of different forms of fertilizers on growth attributes of green gram

3.1.1 Plant height at harvest

The height of the green gram was significantly affected at harvest stage of the crop as displayed in table 1 and fig 1. The highest plant height (73.27 cm) was observed in (T_6) RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS which was found at par with (T_4) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of 19:19:19 @ 0.5% at 30 DAS (71.43 cm), (T_5) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of nano urea @ 0.4% at 30 DAS (70.22 cm) and (T_2) RDF (100%) through solid fertilizer 25:50:00 N:P:K Kg ha^{-1} + rhizophos (68.76 cm). However, lowest plant height was observed in (T_1)

Control (Without any fertilizer) (49.38 cm).

Phosphorus is a critical element in the internal physiology of plants, significantly contributing to the synthesis of nucleic acids, enzymes, phospholipids and energy-rich compounds. The application of treatment (T_6) RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS resulted in an increase in plant height (cm) of green gram. This enhancement can be linked to the stimulation of protein synthesis for cell division, facilitated by the increased availability of phosphorus, which positively influenced plant height (Malhotra *et al.*, 2018) [11]. Nayak *et al.* (2020) [13] also found highest plant height of 11.5 cm at 45 DAS due to application of MAP (12:61:00) in pots grown on soil as growing media. Biradar *et al.* (2023) [2] also found similar results of increased plant height due to application of RDF + 12:61:00 @ 1% Spray at 45 DAS.

3.1.2 Number of root nodules plant^{-1}

The number of root nodules plant^{-1} of green gram was observed to be statistically significant at harvest stage of the crop and has been presented in table 1 and graphically represented in fig 1. Maximum number of root nodules plant^{-1} at harvest stage was observed in (T_6) RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS (33.41) which was found at par with (T_4) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of 19:19:19 @ 0.5% at 30 DAS (31.82), (T_5) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of nano urea @ 0.4% at 30 DAS (30.10) and (T_2) RDF (100%) through solid fertilizer 25:50:00 N:P:K Kg ha^{-1} + rhizophos (29.61). Significantly minimum number of root nodules plant^{-1} was observed in treatment (T_1) Control (Without any fertilizer) (22.00).

This may be attributed due to enhanced root development and increased nodulation, resulting from elevated rhizobium activity in the rhizosphere at higher phosphorus levels. This condition subsequently leads to the formation of a greater number of active root nodules (Gebremariam and Tesfay, 2021) [5]. Similar results of increased number of nodules was also found by Nayak *et al.* (2020) [13] due to application of MAP (12:61:00) in pots grown on soil as growing media.

3.2 Effect of different forms of fertilizers on yield attributes of green gram

3.2.1 Number of pods nodules plant^{-1}

The data presented in table 2 and fig 2 depicting number of pods plant^{-1} of green gram was found significantly affected. Treatment (T_6) RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS (23.15) was found with maximum number of pods plant^{-1} as compared to other treatments but was found at par with (T_4) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of 19:19:19 @ 0.5% at 30 DAS (22.73), (T_5) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of nano urea @ 0.4% at 30 DAS (21.80) and (T_2) RDF (100%) through solid fertilizer 25:50:00 N:P:K Kg ha^{-1} + rhizophos (20.37). However, significantly minimum number of pods plant^{-1} was observed under treatment (T_1) Control (Without any fertilizer) (15.56).

The increase in number of pods plant^{-1} due to application of treatment (T_6) RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS can be attributed to the optimum phosphorus levels which resulted in effective root development which could have resulted in increased biomass of plants due to more photosynthesis and more nutrient supplied to plants could have helped in increased number of pods. Similar results of increased number of pods due to foliar application of 0.5% mono ammonium phosphate (MAP) were also reported by Sivakumar *et al.* (2021) [20] while working on red gram. Phule and Raundal (2022) [18] also found highest number of pods plant^{-1} (25.97) due to application of a foliar spray of 12:61:00 at a concentration of 1.5% prior to flowering.

3.2.2 Grain yield

The grain yield (kg ha^{-1}) of green gram was recorded after harvest stage of the crop which was found significantly influenced by the application of different forms of fertilizers which is tabulated in table 3 and graphically depicted in fig 3. Maximum grain yield among all the treatments was found in treatment (T_6) RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS (1270.53 kg ha^{-1}) which was found at par with (T_4) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of 19:19:19 @ 0.5% at 30 DAS (1241.21 kg ha^{-1}), (T_5) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of nano urea @ 0.4% at 30 DAS (1182.66 kg ha^{-1}) and (T_2) RDF (100%) through solid fertilizer 25:50:00 N:P:K Kg ha^{-1} + rhizophos (1128.23 kg ha^{-1}) whereas significantly minimum grain yield was observed in treatment (T_1) Control (Without any fertilizer) (812.29 kg ha^{-1}).

This can be attributes to increased availability of phosphorus which might have increased number of root nodules resulting in absorption of higher amount of nutrients required for production of photosynthates and dry matter eventually leading to higher grain yield per hectare. Phule (2018) [17] while working on green gram also revealed increased grain yield due to foliar application of 12:61:00 @ 1.5%. While experimenting on chickpea Yewale *et al.* (2025) [23] also found an increase in grain yield with the application of 100% P_2O_5 through DAP + One spray of 12:61:00 @ 1.0% at 30 DAS.

3.2.3 Straw yield

The data regarding to stover yield (kg ha^{-1}) of green gram interpreted in table 3 and fig 3 indicate significant variations among different treatments containing different forms of fertilizer. Highest stover yield was recorded in treatment (T_6) RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS (2094.35 kg ha^{-1}) which was found at par with (T_4) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of 19:19:19 @ 0.5% at 30 DAS (2044.52 kg ha^{-1}), (T_5) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of nano urea @ 0.4% at 30 DAS (1901.26 kg ha^{-1}) and (T_2) RDF (100%) through solid fertilizer 25:50:00 N:P:K Kg ha^{-1} + rhizophos (1840.00 kg ha^{-1}). However, lowest stover yield was recorded in treatment (T_1) Control Without any fertilizer) (1340.78 kg ha^{-1}).

Phosphorus application improves root development and overall plant vigor, leading to better nutrient and water uptake in green gram. This promotes enhanced vegetative growth, resulting in increased biomass accumulation and higher straw yield. Phosphorus also supports efficient photosynthesis and energy transfer, essential for plant growth. Consequently, adequate phosphorus nutrition significantly contributes to improved straw yield in green gram. Phule and Raundal (2022) [18] also found an increased straw yield of 30.72 q ha^{-1} when applied with foliar spray of 12:61:00 at a concentration of 1.5% prior to flowering stage. Similar results were also found by Biradar *et al.* (2023) [2] while working on soybean in which application of RDF+12:61:00 @ 1% Spray at 45 DAS resulted in increased straw yield (3135.47 kg ha^{-1}).

3.3 Effect of different forms of fertilizers on Economics

3.3.1 Gross Monetary Return

The data in table 4 and fig 4 depicted significant effect of different treatments on gross monetary returns with grand mean value of Rs 76365 ha^{-1}. Maximum gross monetary return was recorded by treatment (T_6) RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS (Rs 87192 ha^{-1}) and it was found at par with treatment (T_4) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of 19:19:19 @ 0.5% at 30 DAS (Rs 85179 ha^{-1}) and (T_5) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of nano urea @ 0.4% at 30 DAS (Rs 81143 ha^{-1}). The lowest gross monetary return (Rs 55745 ha^{-1}) was recorded with (T_1) Control (Without any fertilizer). Similar results of increased gross monetary return was also found by Phule (2018) [17] in green gram.

3.3.2 Net Monetary Return

Table 4 and fig 4 reveals that Net Monetary Return varied from Rs 36527 ha^{-1} to Rs 15256 ha^{-1} with grand mean value of 28754 ha^{-1}. Maximum Net Monetary Return was observed under the effect of (T_6) RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS (Rs 36527 ha^{-1}) which was followed by (T_4) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of 19:19:19 @ 0.5% at 30 DAS (Rs 35021 ha^{-1}) and (T_5) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of nano urea @ 0.4% at 30 DAS (Rs 31798 ha^{-1}). However, lowest Net Monetary return was observed in treatment (T_1) Control (Without any fertilizer) (Rs 15256 ha^{-1}). Yewale *et al.* (2025) [23] in chickpea and Singh *et al.* (2017) [19] also found comparable findings while working on lentil.

3.3.3 Benefit cost ratio

Findings in table 4 and fig 5 reveals that maximum benefit cost ratio was observed in treatment (T_6) RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS (1.72) followed by (T_4) RDF (75%) through solid fertilizer + rhizophos + one foliar spray of 19:19:19 @ 0.5% at 30 DAS (1.70) whereas lowest benefit cost ratio was observed for treatment (T_1) Control (Without any fertilizer) (1.38). However, grand mean value of effect of different treatments on benefit cost ratio was found to be 1.60. Yewale *et al.* (2025) [23] also found increased benefit cost ratio while working on chickepea with the application of foliar spray of 12:61:00 at a concentration of 1.0% at 30 days after sowing. Phule (2018) [17] also found similar results while working on green gram with the application of foliar spray of 12:61:00 @ 1.5%.

Table 1: Effect of different forms of fertilizers on growth attributes of green gram

Treatment	Plant height (cm)	Number of root nodules $plant^{-1}$
T_1: Control (Without any fertilizer)	49.38	22.00
T_2: RDF (100%) through solid fertilizer 25:50:00 N:P:K Kg ha^{-1} + rhizophos	68.76	29.61
T_3: RDF (75%) through solid fertilizer + rhizophos	64.53	26.58
T_4: RDF (75%) through solid fertilizer + rhizophos + one foliar spray of 19:19:19 @ 0.5% at 30 DAS	71.43	31.82
T_5: RDF (75%) through solid fertilizer + rhizophos + one foliar spray of nano urea @ 0.4% at 30 DAS	70.22	30.10
T_6: RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS	73.27	33.41
S.E. (m) (±)	2.27	1.29
C.D. @ 5%	6.83	3.88

Table 2: Effect of different forms of fertilizers on number of pods $plant^{-1}$ of green gram

Treatment	Number of pods $plant^{-1}$
T1: Control (Without any fertilizer)	15.56
T_2: RDF (100%) through solid fertilizer 25:50:00 N:P:K Kg ha^{-1} + rhizophos	20.37
T_3: RDF (75%) through solid fertilizer + rhizophos	18.93
T_4: RDF (75%) through solid fertilizer + rhizophos + one foliar spray of 19:19:19 @ 0.5% at 30 DAS	22.73
T_5: RDF (75%) through solid fertilizer + rhizophos + one foliar spray of nano urea @ 0.4% at 30 DAS	21.80
T_6: RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS	23.15
S.E. (m) (±)	0.93
C.D. @ 5%	2.82

Table 3: Effect of different forms of fertilizers on yield of green gram

Treatment	Grain yield (kg ha^{-1})	Stover yield (kg ha^{-1})
T_1: Control (Without any fertilizer)	812.29	1340.78
T_2: RDF (100%) through solid fertilizer 25:50:00 N:P:K Kg ha^{-1} + rhizophos	1128.23	1840.00
T_3: RDF (75%) through solid fertilizer + rhizophos	1042.58	1614.16
T_4: RDF (75%) through solid fertilizer + rhizophos + one foliar spray of 19:19:19 @ 0.5% at 30 DAS	1241.21	2044.52
T_5: RDF (75%) through solid fertilizer + rhizophos + one foliar spray of nano urea @ 0.4% at 30 DAS	1182.66	1901.26
T_6: RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS	1270.53	2094.35
S.E. (m) (±)	49.48	86.73
C.D. @ 5%	149.14	261.44

Table 4: Effect of different forms of fertilizers on Economics of green gram

Treatment	GMR (Rs ha^{-1})	Cost of cultivation (Rs ha^{-1})	NMR (Rs ha^{-1})	B:C Ratio
T_1: Control (Without any fertilizer)	55745	40489	15256	1.38
T_2: RDF (100%) through solid fertilizer 25:50:00 N:P:K Kg ha^{-1} + rhizophos	77419	48432	28987	1.60
T_3: RDF (75%) through solid fertilizer + rhizophos	71509	46573	24936	1.54
T_4: RDF (75%) through solid fertilizer + rhizophos + one foliar spray of 19:19:19 @ 0.5% at 30 DAS	85179	50158	35021	1.70
T_5: RDF (75%) through solid fertilizer + rhizophos + one foliar spray of nano urea @ 0.4% at 30 DAS	81143	49345	31798	1.64
T_6: RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS	87192	50665	36527	1.72
S.E. (m) (±)	3364.54	-	-	-
C.D. @ 5%	10141.83	-	-	-
G.M.	76364.60	47610.33	28754.27	1.60

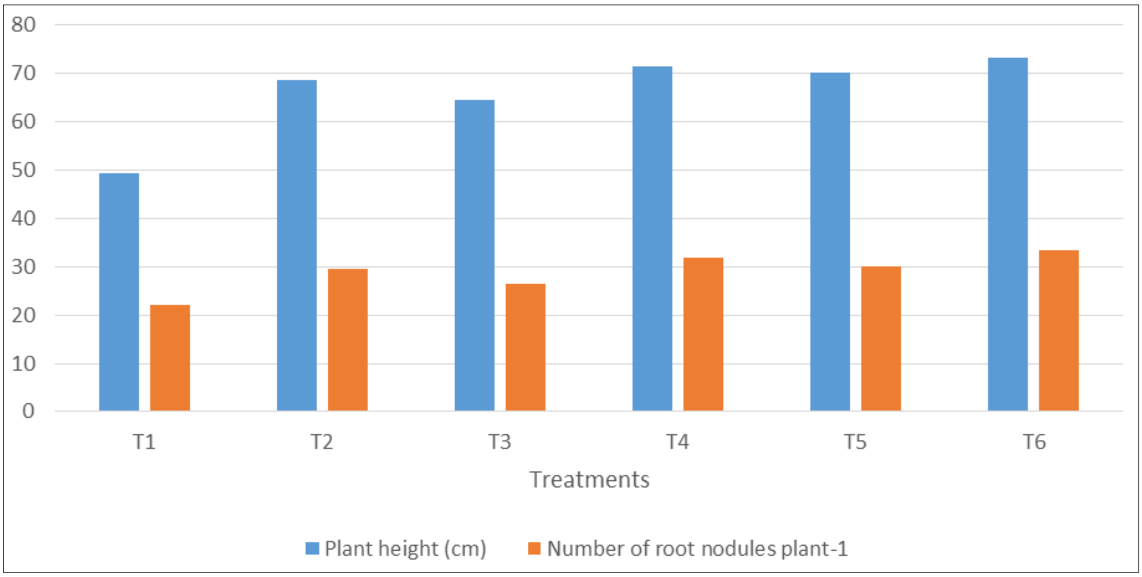

Fig 1: Effect of different forms of fertilizers on growth attributes of green gram

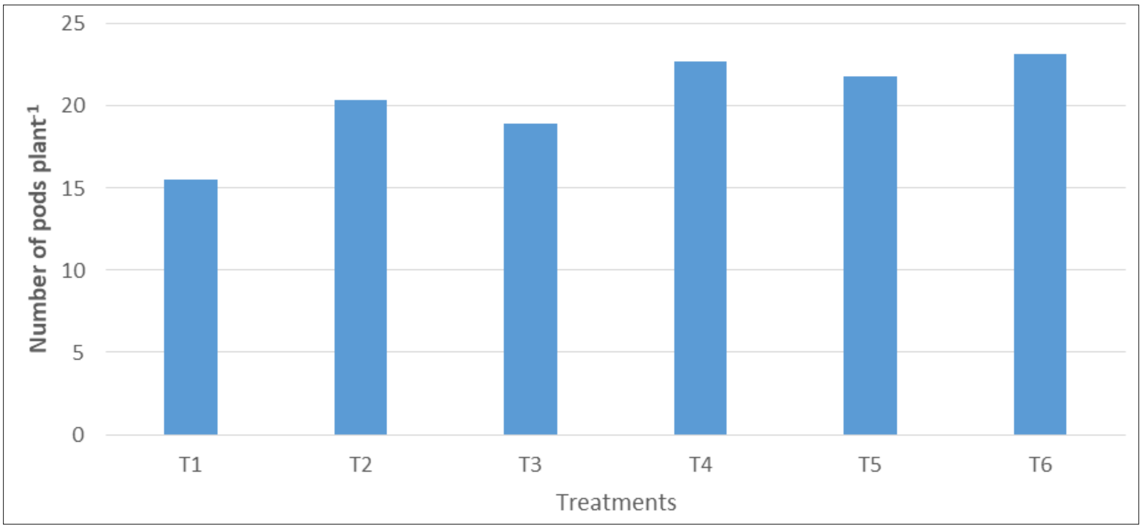

Fig 2: Effect of different forms of fertilizers on number of pods plant^{-1} of green gram

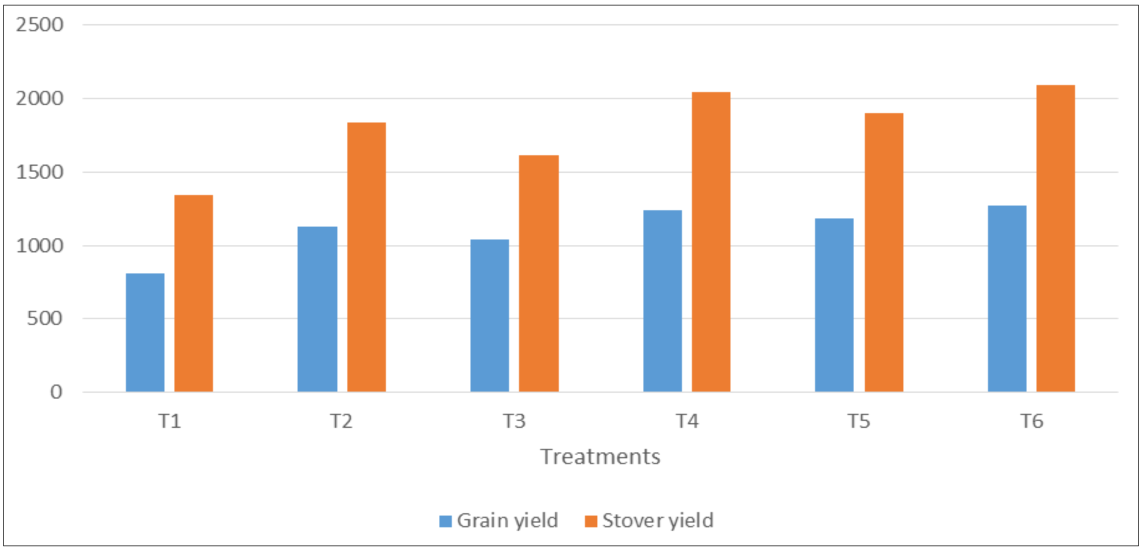

Fig 3: Effect of different forms of fertilizers on yield of green gram (Kg ha^{-1})

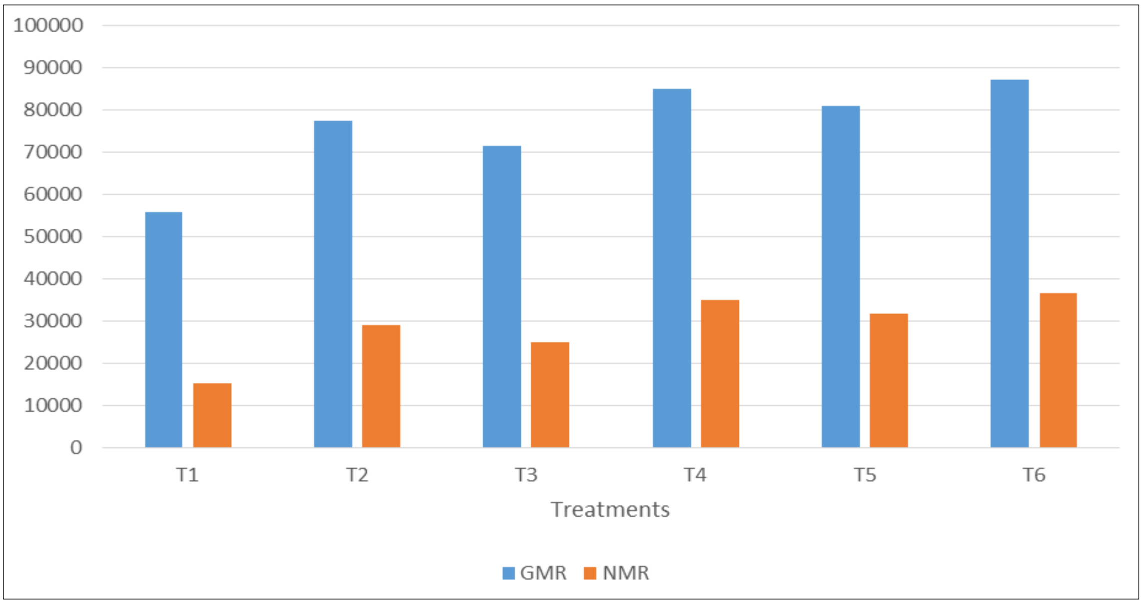

Fig 4: Effect of different forms of fertilizers on GMR (Rs ha^{-1}) and NMR (Rs ha^{-1}) of green gram

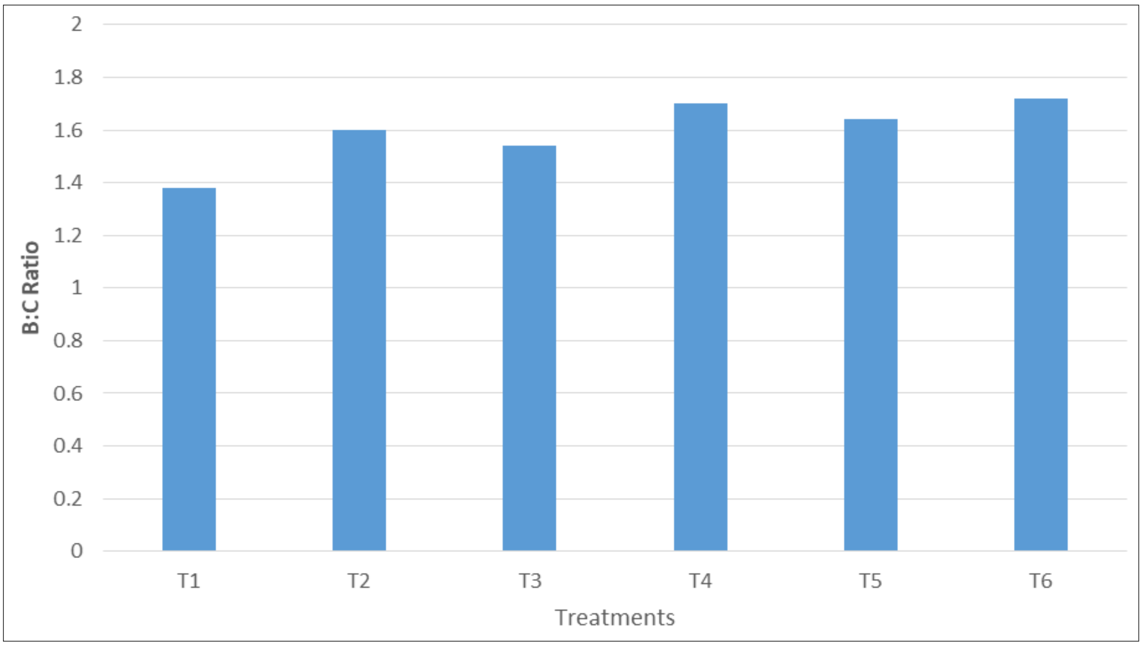

Fig 5: Effect of different forms of fertilizers on benefit cost ratio of green gram

4. Conclusion
It can be concluded that the green gram (*Vigna radiata* L.) performed best with RDF (75%) through solid fertilizer + rhizophos + One foliar spray of 12:61:00 @ 0.5% at 30 DAS (T_6). This treatment was found most effective in enhancing growth attributes, yield attributes including grain and stover yield and economic returns, showing improvement compared to other treatments. The advantageous effect can be attributed to improved phosphorus availability, which stimulated root development, nutrient uptake and photosynthesis, ultimately resulting in higher productivity and profitability of green gram cultivation.

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