

International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
IJABR 2025; SP-9(1): 349-352
www.biochemjournal.com
Received: 12-10-2024
Accepted: 15-11-2024

Rajeevana I
Scientist, Department of Soil
Science, Krishi Vigyan
Kendra, Periyavaram,
Venkatagiri, Tirupati, Andhra
Pradesh, India

Govinda Rajulu B
Director of Extension, Dr.
YSRHU, Andhra Pradesh,
India

Sreenivasa Reddy D
Senior Scientist & Head, Krishi
Vigyan Kendra, Periyavaram,
Venkatagiri, Tirupati, Andhra
Pradesh, India

Thirupal D
Scientist, Department of
Horticulture, Krishi Vigyan
Kendra, Periyavaram,
Venkatagiri, Tirupati, Andhra
Pradesh, India

Nagarjuna Reddy P
Scientist, Department of
Agril.Extension, Krishi Vigyan
Kendra, Periyavaram,
Venkatagiri, Tirupati, Andhra
Pradesh, India

Vijayasree B
Scientist, Department of Home
Science, Krishi Vigyan Kendra,
Periyavaram, Venkatagiri,
Tirupati, Andhra Pradesh,
India

Corresponding Author:
Rajeevana I
Scientist, Department of Soil
Science, Krishi Vigyan
Kendra, Periyavaram,
Venkatagiri, Tirupati, Andhra
Pradesh, India

Effect of integrated nutrient management practices on yield, cost economics of brinjal crop

Rajeevana I, Govinda Rajulu B, Sreenivasa Reddy D, Thirupal D, Nagarjuna Reddy P and Vijayasree B

DOI: <https://doi.org/10.33545/26174693.2025.v9.i1Se.3496>

Abstract

Demonstrations on Integrated Nutrient Management practices in Brinjal was conducted by KVK, Periyavaram emphasized on sustainable production of vegetables with higher yield which ultimately improves the economy and better livelihood of the vegetable grower. The present demonstrations were carried out in brinjal during 2021-22, 2022-23 and 2023-24 respectively. The yield obtained in demonstrated plot was 14.7, 15.5 and 16 t/ha during 2021-22, 2022-23 and 2023-24 respectively. The other yield parameters were also recorded in increasing trend. The net returns were recorded 1,69,164 Rs/ha, 2,54,144 Rs/ha and 3,08,469 Rs/ha and benefit, cost ratio was 2.26:1, 2.51:1 and 2.58:1 during 2021-22, 2022-23 and 2023-24 respectively. There was increased productivity over farmers practice and reduced extension gap and technology gap was could be due to variation in the soil fertility, varied climatic conditions, GMP followed by the farmers and also higher rated technology adoption. The present technology was very much feasible based on the lower technology index recorded in the study.

Keywords: Integrated nutrient management practices, organic manures, vegetable special, productivity, net returns and technology index

Introduction

Brinjal (*Solanum melongena* L.) belongs to the order Polemoniales, family *Solanaceae* and having chromosome no. $2n = 24$. The cultivated brinjal is of Indian origin and has been in cultivation for long time and centre of origin was in the Indo Burma region. Brinjal is one of the most common and popular vegetable crop grown in India and occupying a pride of place in every food of all people which is cultivated as one of the leading and the second major vegetable crops next to tomato. Brinjal is being cultivated in India over an area of 7.22 lakh ha with an average annual production of 134.43 lakh tonnes with productivity of 18.8 t/ha. The productivity of brinjal can be increased by using several techniques viz., integrated nutrient management, organic farming and good hybrid seeds. Since the nutrient turnover in soil plant system is considerably high in intensive vegetable cultivation, neither the chemical fertilizer nor the organic manure alone can help achieve sustainable production (Khan *et al.*, 2008) [5]. Moreover, the application of high input technologies such as chemical fertilizers, pesticides, herbicides improve the production but there is growing concern over the adverse effects of the use of chemicals on human health, soil productivity and environment quality. (Sharma *et al.*, 2012) [10]. The growth, yield and fruit quality of Brinjal are largely dependent on INM system Integrated nutrient management (INM) is the technique of applying adequate and balanced amounts of organic manures, inorganic fertilizers and biofertilizers to maintain soil productivity, soil fertility and soil health. Many studies have demonstrated that combining organic, inorganic, and biological fertilizer sources increases nutrient availability and synchronizes nutrient release and uptake by crops, as well as having a good effect on soil qualities. which is the most crucial as well as basic factor and is found to exert a great influence not only on growth, yield and fruit quality of Brinjal but also for obtaining sustained productivity. As a result, for enhancing brinjal productivity and sustaining soil health, integrated nutrient management may be a better option than sole use of either organic or inorganic fertilizer. Keeping in view the present investigation was carried out to study the effect of Integrated Nutrient Management practices on brinjal.

Materials and Methods

The present study was carried out in 30 different farmers' fields of Nellore and Tirupati district during 2021-22, 2022-23 and 2023-24 in brinjal crop. Front Line Demonstrations was conducted at farmer's field in 10 locations covering 4 villages namely Siddavaram, busupalem, ammapalem and petluru during 2021-22, 10 locations covering 3 villages Kalagandha, Gajulapalli, petluru villages during 2022-23 and in 10 locations covering 3 villages kotembedu, chinthakunta, kayyuru in 2023-24 in operational areas of Krishi Vigyan Kendra, Periyavaram, Venkatagiri, Tirupati district of Andhra Pradesh to study the Integrated Nutrient Management practices in brinjal. Integrated Nutrient Management practices consists of application of Farm Yard Manure @ 6 t/acre, Recommended Dose of Fertilizers N:P:K 40-24-24 per acre and spraying of Micro nutrient mixture (IIHR developed Arka Vegetable Special) @ 5 g/lit at the time of 25-30 DAT, 30 days after first spray, 30 days after second spray. The main aim of the demonstration was to popularize Integrated application of nutrients to crop include application of manures, fertilizers and spraying of micro nutrient mixture, Arka vegetable special (developed from Indian Institute of horticultural research, Bengaluru) as foliar application in critical phases of plant growth. The area taken under each demonstration is 0.4 ha. The crop was raised with application of recommended dose of major and secondary nutrients and general cropping practices were followed with the guidance of KVK scientists in respect of package of practices. Technology gap, extension gap and technology index were calculated using following formula as suggested by Samui *et al.*, (2000) ^[8]

$$\text{Increase yield (\%)} = \frac{\text{Demonstration yield} - \text{Farmers yield}}{\text{Farmers yield}} \times 100$$

Table 1: Effect of Integrated Nutrient Management practices on yield and yield attributing parameters.

Year	Farmers Practice			Demonstration			Increase		
	Number of fruits per plant	Average fruit weight (g)	Yield (t/ha)	Number of fruits per plant	Average fruit weight (g)	Yield (t/ha)	Number of fruits per plant	Average fruit weight (g)	Yield (t/ha)
2021-22	40	220	12.6	60	242	14.7	20	22	2.1
2022-23	48	228	13.2	66	247	15.5	18	19	2.3
2023-24	44	231	13.6	67	249	16	23	18	2.4
Mean	44	226.33	14.13	64	246.00	15.40	20.33	19.67	2.27

Table 2: Effect of Integrated Nutrient Management practices on cost economics of brinjal crop.

Year	Farmers practice				Demonstration			
	Gross cost (Rs)	Gross returns (Rs)	Net returns (Rs)	B:C ratio	Gross cost (Rs)	Gross returns (Rs)	Net returns (Rs)	B:C ratio
2021-22	1,24,864	2,72,432	1,47,567	2.18:1	1,34,166	3,03,330	1,69,164	2.26:1
2022-23	1,40,324	3,30,000	1,89,675	2.35:1	1,67,567	4,21,711	2,54,144	2.51:1
2023-24	1,42,900	3,48,738	2,05,838	2.44:1	1,94,594	5,03,063	3,08,469	2.58:1
Mean	1,36,029	3,17,057	1,81,027	2.32	1,65,442	4,09,368	2,43,926	2.45

Average fruit weight (g)

By following Integrated nutrient management practices, resulted in increased average fruit weight of brinjal and showed 22, 19, and 18 g of increased average fruit weight. This result could be due to better absorption of all the micronutrient and secondary nutrients by the leaves of individual plants at the time of critical growth stage. This absorption helped in accumulation of carbohydrates in the final produce of the crop. The results of present demonstration are in accordance with the findings of Bhatt *et al.*, (2004) ^[3] and Amit *et al.*, (2018) ^[2]. This average fruit

Technology gap = Potential yield – Demonstration yield

Extension gap = Demonstration yield – yield under existing practice

Results and Discussion

Yield and yield attributing parameter

Effect of Integrated Nutrient Management practices on yield and yield attributing parameter are presented in Table 1.

Number of fruits/plants (No.)

Yield attributing parameters are very important to determine the ultimate yield of the particular crop. In the present demonstration showed increased number of fruits per plants over farmer's practices. On an average there was increase (Table 1) of 20 fruits/plant, 18 fruits/ plant and 23 fruits/plant in brinjal was observed. In general vegetable growers of KVK, Operational area were not applying organic manures in required quantity, chemical fertilizers are applying more and most of them were not aware of application of mixture of micronutrient, critical stage of application and also type of application. In the present demonstration increased number of fruits per plant due to application of organic manures, RDF and micronutrient mixtures. According to Sukhlal Waskel *et al.*, (2019) ^[11], treatment consisting of VC @ 10 t/ha+ 75% RDF recorded that the highest brinjal yield per plant, fruit yield per plot, number of fruit plant and number of per plant. Spraying of micronutrient mixtures at critical stages was also directed to decrease in flower drop and retention of fruits at the early stage of the crop. According to Upendra *et al.*, (2003) ^[12], mineral nutrition might have increased the number of fruits per plant due to more fruit setting and retention due to availability of both secondary and micronutrient as a foliar application.

increase would ultimately resulted in increase in the total yield.

Yield (t/ha)

There was a significant increase in the yield/ha of brinjal in the demonstration. In brinjal the yield difference of 2.1 tons/ha was observed in farmers practice during the year 2021-22 and the demonstration which was followed by 2.3 t/ha in 2022-23 and 2.4 t/ha in 2023-24. In this brinjal was responded to integrated nutrient management practices. In the brinjal vegetable difference in the yield/ha might be

possible due to increased number of fruits per plant and also increased average fruit weight. Similar results obtained from Patnaik *et al.*, (2001) ^[7] in Cruciferous vegetables cabbage has given the yield difference of 2 t/ha and 1.92 t/ha in cauliflower. This increased yield could be due to increased accumulation of carbohydrates and also other minerals. The similar results were also reported earlier by Aminifard *et al.*, (2010) ^[1] and Biswas *et al.*, (2015) ^[4].

Cost economics of the brinjal crop to integrated nutrient management practices

Data related to gross income and net income are presented in Table 2.

Net returns/ha (Rs)

Net returns of any crop are very much important to improve the socio economic status of the farmers. The main aim of the any demonstration conducted through Krishi Vigyan Kendra is to improve the overall production, enhance the productivity and improve the quality of the produce. In these demonstrations Integrated Nutrient Management technology demonstration resulted in getting the higher returns to the brinjal growers. By following Integrated Nutrient

management increased productivity per hectare area was observed which resulted in increased net returns in every crop taken into consideration under demonstration. In brinjal the gross returns obtained was 3,03,330 Rs, 4,21,711Rs and 5,03,063 Rs per hectare obtained as gross returns, 1,69,164 Rs, 2,54,144 Rs and 3,08,469 Rs per hectare obtained as net returns and benefit cost ratio was 2.26:1, 2.51:1, and 2.58:1 was observed with front line demonstration practices during 2021-22, 2022-23 and 2023-24 respectively. The more price to the produce was obtained basically from increased yield of the individual crop under demonstration which was supported by the improved quality of the produce. According to the farmer's opinion spray of micronutrient helped in improvement of quality of the vegetable through attractive appearance. This quality improvement helped in higher market price nearly 3-7 Rs per kg of the produce than the produce from the farmers practice. Mallikarjun 2021 *et al.*, ^[6] reported that the higher net returns were realised by the farmers from the demonstrated plots than the farmer's practice plot. The similar results were also reported earlier by Aminifard *et al.*, (2010) ^[1]

Table 3: Effect of integrated nutrient management practices on percent increase of productivity and Extension gap, technology gap and technology index

Year	Yield in farmers practice (t/ha)	Average yield in FLD (t/ha)	Increase over Farmers Practice (%)	Extension gap (t/ha)	Technology gap (t/ha)	Technology index (%)
2021-22	12.6	14.7	16.6	2.26	5.3	26.5
2022-23	13.2	15.5	17.4	2.3	4.5	22.5
2023-24	13.6	16	17.6	2.4	4.0	20
Mean	13.13	15.4	17.2	2.32	4.6	23

Effect of micronutrient spray on percent increase of productivity and Extension gap, technology gap and technology index are present in Table 3.

Productivity increase (%), extension gap (t/ha) and technology gap (t/ha)

Integrated Nutrient Management practices resulted in more increase of productivity in Brinjal. In relation to increased productivity reduced extension gap and technology gap was observed. In brinjal extension gap and technology gap was 2.26, 2.3, 2.4 t/ha and 5.3, 4.5, 4.0 t/ha during 2021-22, 2022-2023 and 2023-24 respectively. Similar kind of result was obtained by Savita *et al.* (2016) ^[9] in Okra. On the other hand it was less than 10t/ha in rest of the other vegetable which considered under the demonstration. The technological gap observed may be attributed to variability of soil fertility, climatic condition, management practices, also adoption by the particular farmer and extent of area covered by the particular crop. The extension gap emphasized the need to educate the farmers through various means for the adaptation of this particular integrated nutrient management in brinjal crop of KVK, operational area.

Technology index (%)

During the present demonstration more decreased technology index was observed in brinjal 26.5%, 22.5% and 20% under demonstration. The technology index always shows the feasibility of the particular technology at the farmer field. Lower the value of the technology index indicates the more feasibility of the technology. The similar

results were also reported earlier by Mallikarjun *et al.*, (2021) ^[6]

Conclusion

Integrated Nutrient Management practices, like application of organic manures @ 6-8 t/acre, Recommended Dose of Fertilizers N:P:K 40-24-24 per acre and spraying of Micro nutrient mixture (IIHR developed Arka Vegetable Special) @ 5 g/lit on brinjal has given better result than the other practices. The average number of fruits per plant was higher than the control during all the three years of demonstration. The higher net returns were realised by the farmers from the demonstrated plots than the farmer's practice plot. Following of Integrated Nutrient Management was proved to be very much feasible based on the lower technology index recorded in the study.

References:

1. Aminifard MH, Aroiee H, Fatemi H, Ameri A, Karimpour S. Response of eggplant (*Solanum melongena* L.) to different rates of nitrogen under field conditions. J Cent Eur Agric. 2010;11(4):453-458.
2. Dixit A, Sharma D, Tinku K, Pappu L, Bairwa. Effect of foliar application of some macro and micronutrients on growth and yield of tomato (*Solanum lycopersicum* L.) cv. Arka Rakshak. Int J Curr Microbiol Appl Sci. 2018;6:197-203.
3. Bhatt L, Srivastava BK, Singh BMP. Studies on effect of application of micronutrients on nutrient uptake in tomato. Prog Hortic. 2004;36(2):331-334.

4. Biswas M, Sarkar DR, Asif MI, Sikder RK, Mehraj H, Jamal Uddin AFM. Nitrogen levels on morphological and yield response of BARI Tomato-9. J Sci Technol Environ Inform. 2015;1(2):68-74.
5. Khan MS, Shil NC, Noor S. Integrated nutrient management for sustainable yield of major vegetable crops in Bangladesh. Bangladesh J Agric Environ. 2008;4:81-94.
6. Mallikarjun, Sunilkumar NM, Akshaykumar, Rakesh Varma, Jyoti R. Effect of micronutrient: Vegetable special on enhancing productivity and to improve the socio-economic status of tomato growers of Bidar district of Kalyan Karnataka. Pharma Innov J. 2021;SP-10(12):529-532.
7. Patnaik MC, Bhupal RG, Reddy IP. Response of tomato (*Lycopersicon esculentum*) to zinc and iron. Veg Sci. 2001;28:78-79.
8. Samui SK, Mitra S, Roy DK, Mandal AK, Saha D. Evaluation of front line demonstration on groundnut. J Indian Soc Coastal Agric Res. 2000;18(2):180-183.
9. Savita R, Angad SK, Verma SK, Jain V. Impact of front line demonstration on Okra (*Abelmoschus esculentus* (L.)). J Krishi Vigyan. 2016;5(1):74-76.
10. Sharma JP, Rattan P, Kumar S. Response of vegetable crops to use of integrated nutrient management practices. SABB J Food Agric Sci. 2012;2(1):15-19.
11. Waskel S, Jatav SK, Singh SS. Effect of integrated nutrient management on growth and yield attributes of brinjal. Int J Curr Microbiol Appl Sci. 2019;8(11):1849-1853.
12. Upendra M, Dris SR, Singh B. Mineral nutrition of tomato. J Food Agric Environ. 2003;1(2):176-183.