Integrated Nutrient Management on Growth and Yield of Rice

Objective: Confirm the best Organic Input to enhance the growth & yield of rice crop.

Introduction:

Rice, the cornerstone of sustenance across Asia, particularly in regions like South and Southeast Asia, where it constitutes over 90% of both production and consumption, serves as the backbone of livelihoods for more than 250 million households. Not only does it serve as the primary source of caloric intake, but it also significantly contributes to the agricultural revenue of numerous Asian nations. The last three decades have witnessed a remarkable transformation in rice production, largely attributed to the introduction of modern, high-yield rice varieties and the adoption of Green Revolution technologies, resulting in nearly doubling the rice output in South and Southeast Asia. This progress has not only led to self-sufficiency in rice production for many countries but has also propelled some, like India, into the realm of net rice exporters.

However, the trajectory of population growth indicates a parallel increase in the demand for rice. Consequently, the forthcoming challenge lies in augmenting rice production amidst constraints such as diminishing land availability, water scarcity, reduced labor force, and the imperative to minimize pesticide usage. Meeting this challenge necessitates a paradigm shift towards innovative research, technological advancements, and policy frameworks aimed at boosting rice production sustainably.

This analysis delves into the current landscape of rice production, examining the prevailing constraints, identifying opportunities, and spotlighting the strides made in rice research and development. Additionally, it underscores emerging concerns pertinent to achieving targeted rice production levels, with a special focus on South Asia, notably India. Integrated Nutrient Management emerges as a promising avenue, offering a viable alternative for enhancing rice production while curbing reliance on chemical fertilizers.

Integrated Nutrient Management (INM) stands as a pivotal strategy in augmenting the growth and yield of rice, offering a holistic approach that optimizes nutrient utilization while promoting sustainable agricultural

practices. By integrating organic sources, such as farmyard manure, green manure, and crop residues, with inorganic fertilizers, INM enhances soil fertility, improves nutrient availability, and fosters a balanced nutrient supply to rice crops. This multifaceted approach not only enhances the efficiency of nutrient uptake by plants but also mitigates the adverse environmental impacts associated with excessive chemical fertilizer application. Moreover, INM fosters soil health, resilience to environmental stressors, and overall crop productivity, thereby serving as a cornerstone for achieving food security and agricultural sustainability in rice cultivation. Through its synergistic effects on soil fertility, nutrient management, and crop performance, INM emerges as a promising avenue for ensuring optimal growth and maximizing yields in rice production systems.

Experimental Details:

Crop	Rice	**Treatments**	5
Variety	GAR-13	**Spacing**	20 X 15 cm
Season	*Kharif*	**Plot Size**	Gross plot: 3.30 X 3.00 m
Location	ARDF, Tansa Farm		Net plot: 3.15 X 2.80 m
Design	RBD	**Transplanting Date**	17/07/2023
Replications	4	**RDF**	100:50:50 kg NPK ha^{-1}

Treatment Details:

Treat. No.	Treatment Details
T1	**Control**
T2	**7.5 Tons FYM+100:50:50 kg NPK ha^{-1}**
T3	**10 Tons FYM+100:50:50 kg NPK ha^{-1}**
T4	**10 Tons FYM+75:50:50 kg NPK ha^{-1}**
T5	**10 Tons FYM+50:50:50 kg NPK ha^{-1}**

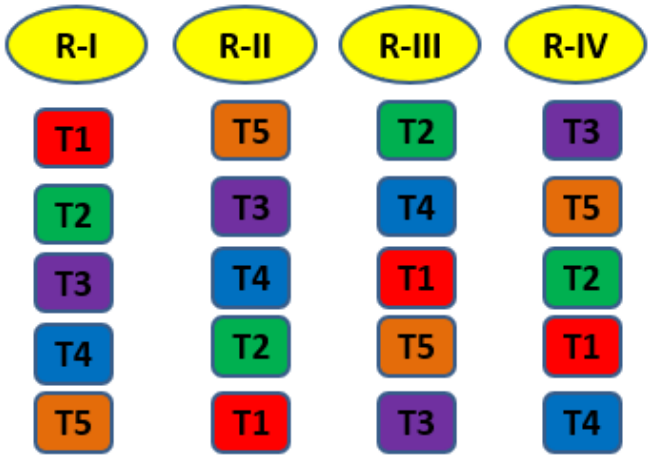
Methodology:

In the kharif season of 2023, an experimental study was conducted at the ASPEE Agricultural Research and Development Foundation Farm, located in Village Nare, Tauka Wada, district Palghar. The study employed a Randomized Block Design (RBD) with four replications (r=4). Five distinct treatments were administered, each representing different inputs: T1 - Control, T2 - 7.5 Tons FYM+100:50:50 kg NPK ha^{-1}, T3 - 10 Tons FYM+100:50:50 kg NPK ha^{-1}, T4 - 10 Tons FYM+75:50:50 kg NPK ha^{-1} and T5 - 10 Tons FYM+50:50:50 kg NPK ha^{-1}. These treatments were applied in splits during the crop cycle through broadcasting, with the first application at transplanting and the second at 30 days after transplanting.

Rice variety 'GR-11' was sown in the first fortnight of June 2023, following seed treatment with the fungicide thiram at a rate of 3 g kg-1 seeds. Transplantation of twenty-five-day-old seedlings was conducted at a spacing of 20 cm x 15 cm, with bed dimensions set at 3.30 m x 3.0 m. Biometric observations were recorded regularly from 30 days after transplanting until harvest, with five plants (n=5) randomly selected from each plot.

The collected data were subjected to rigorous statistical analysis to evaluate the impact of different organic inputs on the growth and yield of rice. The study was meticulously designed with the primary objective of assessing the efficacy of various organic inputs in enhancing rice growth and yield under field conditions.

Layout:



Results:

The higher number of tillers per plant (25.85), number of panicles per plant (11.75), length of panicle (28.32 cm), seeds per panicle (176.15), test weight (22.67 g), grain (6.14 t/ha) and straw (9.65 t/ha) yield were recorded in treatment T_3 *i.e*. application of 10 Tons FYM+100:50:50 kg NPK ha^{-1}.

Graph:

Conclusion:

The data clearly revealed that, the yield obtained with treatment T_3 i.e. application of 10 Tons FYM+100:50:50 kg NPK ha^{-1} was significantly higher than all other treatments and also for growth parameters.