

Long term experiment on lowland rice based on yield target

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ABSTRACT

Fertilizer prescription equation for lowland rice was developed and tested on lithic ustorthent soils of ghat zone of Maharashtra for three years. The yield targets of rice 30 q ha⁻¹ was achieved without addition of organics but with the addition of FYM and biofertilizer treatments the yield targets of 30 and 40 q ha⁻¹, respectively were achieved. Slight improvements in chemical and physical properties were observed due to continuous application of FYM and biofertilizer treatment under study.

Key words : Lowland rice, FYM, Yield target, Fertilizer prescription equation.

High and unpredictable rainfall during rainy season in Igatpuri leads to rice (*Oryza sativa*) to over production associated with environmental consequences largely affecting the soil health arising from long term use of fertilizers in large quantities.

Incorporation of farmyard manure alone or in combination with inorganic fertilizers improves the productivity of rice, sustains soil health and economize fertilizer need. Balanced way of application of both organic and inorganic appears to be an ideal position to meet nutrient requirements rather than application of the two. Sharma and Dixit (1987) observed that the yield of Soybean was significantly increased by the combined use of fertilizers and FYM over chemical fertilizer alone. Mishra and Sharma (1995) conducted 10 years study on calcareous soils of north Bihar and reported that continuous cropping without addition of organic manure decreased the soil organic carbon, available N,P and K content appreciably.

Singh *et al.* (2001) studied the effect of long term integrated use of FYM, manure and fertilizer on nutrient status of soil and productivity of rice wheat system in Typic Haplustert and concluded that productivity of rice-wheat declined with continuous application of fertilizer N which was explicitly related to the depletion in availability of nutrients like N and K. A balance use of nutrients through fertilizer NPK and FYM can successfully maintain a high level of soil productivity.

An INM may play a vital role in sustaining both soil health and crop production on long-term basis. With these considerations in view, the present study was conducted during *kharif* 2003-2005.

MATERIALS AND METHODS

The long-term field experiment was conducted at Zonal Agricultural Research Station, Igatpuri Dist. Nashik Western Ghat Zone of Maharashtra during 2003-2005. Soil type was Lithic Ustoethent (Rajur soil series) with pH 6.34, EC 0.16 dSm⁻¹, low in available N (228 kg ha⁻¹) medium in available phosphorous (18.5 kgha⁻¹) and low in potassium (180 kg ha⁻¹). The experiment was laid out in RBD with three replication and eight treatments *viz.*

Treatment Details:

- T₁ : Control
- T₂ : NPK (135:176:182) based on 40 qha⁻¹ target yields (T) of rice through chemical fertilizer
- T₃ : Target yields (T), 100% N dose through organic
- T₄ : Target yield (T) 75% N dose through inorganic fertilizers, 25% through organic
- T₅ : Target yield (T) 50% N dose through inorganic fertilizers, 50% through organic
- T₆ : Target yield (T) 25% N dose through inorganic fertilizers, 75% through organic
- T₇ : Recommended dose of NPK (100-50-50) + FYM 5 mq ha⁻¹

The variety of rice used for experiment was Indrayani and fertilizer prescription equation used for low land rice is :

$$FN = 5.20 T - 0.34 SN$$

$$FP_2O_5 = 9.40 T - 13.66 SP$$

$$FK_2O = 2.73 T - 0.16 SK$$

Whereas FN, FP₂O₅, FK₂O are fertilizers to be added, T is 40 q ha⁻¹ target, SN, SP and SK are soil available nutrients. Soils were analyzed for different soil parameters like pH, EC, Organic Carbon and available N, P and K by using standard procedure outlined by Jackson (1973).