

Research Paper :

Effect of biofertilizers on crop yield and soil available nutrients of rice and maize in alfisols of Nagarjuna Sagar left canal command area of Andhra Pradesh, India

M. RAJESHWAR AND M.A.AARIFF KHAN

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ABSTRACT

On farm field experiment with the participation of farmers the effect of biofertilizers on soil fertility and crop yield of rice and maize was studied in Alfisols during *Kharif* 2006 and *Rabi* 2006-07, respectively at Pilot area Ganapavaram of Nagarjuna Sagar Project left canal command under area located in Kodad mandal of Nalgonda district, Andhra Pradesh was conducted in A.P. Water Management Project affiliated to Acharya N.G. Ranga Agricultural University, Hyderabad. In rice the high yield was observed in RDF + application of biofertilizers (6800 kg ha⁻¹) followed by Farmers practice (6600 kg ha⁻¹). Similarly in maize the high yield was recorded in RDF + biofertilizers (6500 kg ha⁻¹) followed by 6150 kg ha⁻¹ in 25% low RDF + bio fertilizers. There was no difference in pH when compared to initial soil status but there is slight decrease in EC. The change in organic carbon content was more in rice treatments than maize, the OC content was decreased in all treatments when compared to initial status. Increasing the availability of N was more in RDF + Biofertilizers followed by farmers practice in *Kharif* rice and decreased in 25% low RDF + Biofertilizers and RDF. Where as in *Rabi* maize the availability of N content was decreased. The P availability was increased in all the treatments in *Kharif* rice, where as in *Rabi* maize there was no much difference. K availability was decreased more in RDF followed by 25% low RDF + application of biofertilizers both in rice and maize.

See end of the article for authors' affiliations

Correspondence to :

M.A.AARIFF KHAN

AICRP, Agroforestry,
Acharya N.G. Ranga
Agricultural University,
HYDERABAD (A.P.)
INDIA

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The Nagarjuna Sagar Project (NSP) is one of the biggest multi purpose projects on Krishna river in South India irrigating nearly about 11 lakhs hectare area. The NSP Left canal command area spread in Nalgonda, Khammam and Krishna districts of Andhra Pradesh with a total command of 3.87 lakhs ha, mostly consists of red sandy loams locally known as chalka soils followed by mixed sandy loams (dubba soils) together constitutes 75% of the area. The remaining 25% area belongs to clay and clay loam soil (Black cotton soils). The soils are poor in nutrient status and farmers are using large quantities of chemical fertilizers and pesticides for the cultivation of crops (Rajeshwar and Aarif Khan, 2009). The excessive usage on long run leads to the gross reduction of beneficial micro flora of the soil ecosystem. Continuous application of harmful chemicals led to decrease in the fertility of soil and resurgence of many crop pests. Due to this ill affects the yields of the crop decreased and increased the cost of production. The use of chemical fertilizers and pesticides has caused tremendous harm to the soil environment. Biofertilizers are one which help to solve such problems. Biofertilizers have an advantage over chemical fertilizers, as they provide nutrients in addition to plant growth promoting substances like hormones, vitamins, amino acids etc. (Shivankar *et al.*, 2000). The

nitrogen fixing microorganism supply in addition to nitrogen, considerable amount of organic matter enriching the structure of soil. Crops have to be provided with chemical fertilizers repeatedly to replenish the loss of nutrients utilized for crop growth. On the other hand biofertilizers supply the nutrients continuously through out the entire period of crop growth in the field under favorable conditions. Nitrogen is an essential major plant nutrient. The phosphobactor biofertilizer containing bacteria called *Bacillus Megaterium var phosphaticum*, which secretes organic acids such as formic, acetic, propionic, lactic, glycolic, humalic and succinic acids. These acids lower the pH and bring about the dissolution of bond form of phosphate (Dange *et al.*, 2008). Then plant can take this soluble form of phosphorus. Hence, introduction of biofertilizers is necessary for improving the soil fertility and productivity besides reducing the expenditure on chemical fertilizers. In order to provide a base line data on the effect of biofertilizers on soil fertility and on crop yield of rice, maize the present study was taken up in Ganapavaram pilot area of NSP left canal command area in Nalgonda district of Andhra Pradesh under A.P Water Management Project, a collaborative project between Alterra ILRI, The Netherlands and Acharya N.G Ranga Agricultural University, Hyderabad, India.