

Adapting Nutrient Expert® for Maize in India: A Success Story¹

Maize is the third most important food crop after rice and wheat in India. In Southern India, farmers are seeing the potential of maize for higher productivity and profitability, and it is a suitable rice substitute in areas where water shortage is a constraint for growing rice. However, average maize yields are lower than reported attainable yields largely due to inadequate or improper fertilization. Thus, an opportunity exists for improving maize yields through the right use of nutrients.

Adaptation and field evaluation

The Nutrient Expert® (NE) for Hybrid Maize, originally developed by IPNI Southeast Asia Program for favorable tropical environments, has been adapted to the maize growing conditions in India. The adaptation and development of the South Asia version involved the participation of local stakeholders from both public and private sectors. Field evaluation was conducted at 82 locations representing varying growing conditions in Southern India during the monsoon and winter seasons of 2011-2012.

Fertilizer use

NE was used to develop fertilizer recommendations for each field, which was tested against existing farmers' fertilizer practice (FFP) and local state recommendation (SR). Fertilizer application rates of farmers ranged from 80 to 550 kg N/ha, 38 to 230 kg P₂O₅/ha, and 23 to 352 kg K₂O/ha in the monsoon season; and ranged from 80 to 855 kg N/ha, 25 to 753 kg P₂O₅/ha, and 0 to 270 kg K₂O/ha in the winter season (Figure 1). Compared with FFP, NE reduced N, P, and K application rates by 17, 56, and 58% respectively in the monsoon season and by 20, 61, and 28% respectively in the winter season.

Field performance

Across all sites, NE increased yield and economic benefit (i.e., gross return above fertilizer cost or GRF) over FFP and SR (Figure 2). Compared to FFP, NE increased yield by 1.06 t/ha and GRF by 12,902 INR/ha in the monsoon season. Similarly, in the winter season, NE increased yield by 1.12 t/ha and GRF by 13,138 INR/ha. The increase in GRF with NE was largely due to the increase in grain yield, but the reduction in fertilizer cost at some sites also contributed to the increase in economic benefit.

¹ Adapted from Satyanarayana et al. 2013. Better Crops 97 (1): 21-24

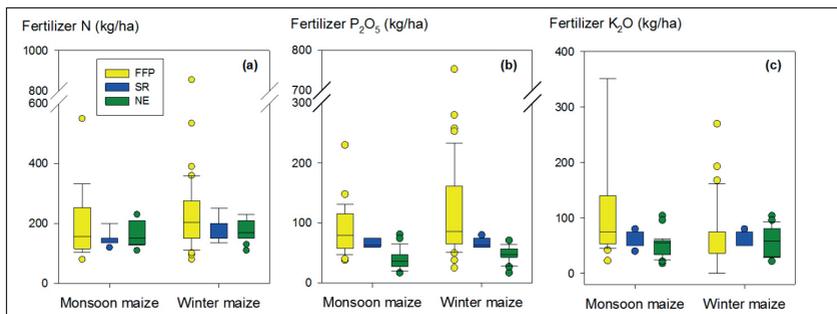


Figure 1. Fertilizer N, P, and K rates (kg/ha) in maize using FFP, SR, and NE Maize in India during the monsoon ($n=32$) and winter ($n=50$) maize seasons, 2011-2012.

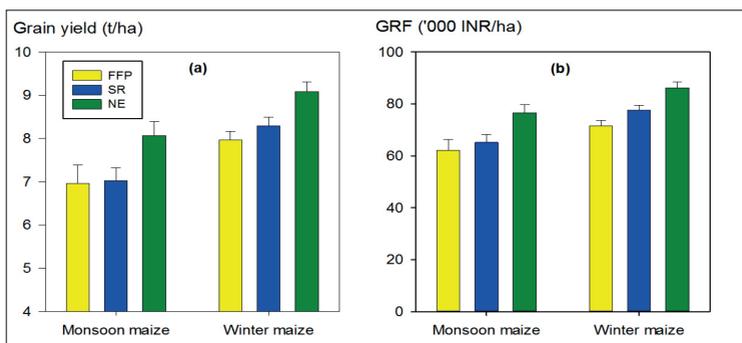


Figure 2. yield and gross return above fertilizer cost (GRF) in maize using FFP, SR, and NE Maize in India during the monsoon ($n=32$) and winter ($n=50$) maize seasons, 2011-2012. Error bars show the standard error of the mean.

Summary

The Nutrient Expert® for Hybrid Maize has been successfully adapted to the maize growing conditions in India as demonstrated by its field performance at multiple locations in Southern India during the monsoon and winter maize seasons in 2011-2012.

Maize production in Southern India can be profitable in either monsoon or winter season. In rice areas where water shortage is a constraint, growing maize instead of rice will likely lead to higher profits.

NE can increase yield and economic benefit in maize through optimal and balanced application of nutrients tailored to field-specific conditions. NE provides recommendations that are consistent with the 4R Nutrient Stewardship concept, i.e., apply the right source of nutrients, at the right rate, at the right time, and in the right place.

Nutrient Expert® for Hybrid Maize – Version 1.0 (South Asia - India) has been officially launched in June 2013. Interested users may contact IPNI South Asia Program (sap.ipni.net).