

Site-Specific Nutrient Management of Wheat in Eastern India

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The main objective of this study was to evaluate the site-specific nutrient management (SSNM) in wheat in eastern India. The project aims to quantify the variation in soil nutrient supply in wheat areas in West Bengal and Jharkhand and develop a SSNM approach that improves on common farm practice (FP). In the second year, 19 farmer field trials were set up in the alluvial and red-lateritic soil zones of West Bengal and Jharkhand. The study compared nine treatments including omission plots for N, P, K, S, Zn, B, the FP, the soil test-based recommendation, and the complete NPK treatment of 140-70-100 kg N-P₂O₅-K₂O/ha (SSNM) that also included required amounts of secondary and micronutrients.

The average yield in the SSNM treatment varied between 3.6 to 6.0 t/ha. Omission plot data revealed that yield losses were highest in N omission plots, indicating its importance between the three macronutrients. However, the impact of omitting N varied across locations. The ΔN yield (i.e., NPK plot yield - PK plot yield), which estimates the actual yield loss due to N omission, varied between 0.8 to 4.8 t/ha, suggesting variability of N supply capacity across the experimental sites. The ΔP and ΔK values were lower as compared to ΔN values and varied between 0.4 to 1.8 t/ha and 0.1 to 2.3 t/ha, respectively. In the red-lateritic soil belt of Birbhum District, West Bengal, omission of N resulted in a 78% reduction in wheat grain yield over the SSNM treatment. Such yield reductions for P and K omission were 50% and 64%, respectively. In the red-lateritic soils of Jharkhand, the impact of P omission (- 1 t/ha) was slightly higher than N omission (0.8 t/ha). However, the highest yield loss from omitting N was in the Terai alluvial zone of North Bengal where wheat yield declined by 4.8 t/ha. The impact of P and K omission in North Bengal was less than 0.8 t/ha, and omissions of S, B, and Zn also caused variations in crop yields.

Analyses of soil and plant samples are in progress for all the locations to optimize the NPK treatment for each location.