



Influence of different nutrient management practices on productivity, profitability and nutrient dynamics in basmati rice (*Oryza sativa*) – wheat (*Triticum aestivum*) cropping systems in western Indo-Gangetic Plains of India

N K JAT¹, R S YADAV², SUDHIR KUMAR³, M SHAMIM⁴, N RAVISANKAR⁵, SUBHASH BABU⁶
and A S PANWAR⁷

ICAR-Indian Institute of Farming Systems Research, Modipuram, Uttar Pradesh 250 110, India

Received: 15 November 2018; Accepted: 17 December 2018

ABSTRACT

A field investigation was carried out at ICAR-Indian Institute of Farming Systems Research, Modipuram during 2013–15 to devise the best nutrient management strategy in basmati (*Oryza sativa* L.)– wheat (*Triticum aestivum* L. emend Fiori and Paol) cropping system. Investigation used six nutrient management practices, viz. 100% organic; 75% organic + innovative practices; 50% organic + 50% inorganic; 75% organic + 25% inorganic; state recommendation and 100% inorganic. Grain yield and nutrient uptake of basmati rice and wheat were found at par under organic (100% organic and 75% organic + innovative practices) and integrated nutrient management practices (50% organic + 50% inorganic and 75% organic + 25% inorganic), however it was significantly higher compared to 100% inorganic nutrient management. Organic nutrient management, i.e. 100% organic and 75% organic + innovative practices resulted in 42.4 and 37.7% higher grain yield in case of basmati rice and 29.3 and 39.7% higher yield in case of wheat, respectively over 100% inorganic; besides being superior in terms of soil available N, P, K and organic carbon. Additional net returns to the tune of ₹ 53.2 × 10³/ha and ₹ 59.7 × 10³/ha from basmati rice-wheat cropping system was recorded under 100% organic and 75% organic + innovative practices, respectively over 100% inorganic. Nutrient management through 75% organic + innovative practices in basmati rice–wheat cropping system resulted in ₹ 6.5 × 10³/ha additional returns over 100% organic nutrient management and it also scored highest in terms of nitrogen use efficiency of both basmati rice (48.5 kg/kg N) and wheat (38.1 kg/kg N). A significantly higher residual soil fertility in terms of available N, P, K and organic carbon in soil as compared to 100% inorganic nutrient management was also observed.

Key words: Basmati rice-wheat cropping system, Indo-Gangetic Plains, Nutrient uptake, Organic nutrient management, Productivity