

## **Crop Productivity, Nutrient Uptake and Apparent Balance for Rice Based Cropping Systems under Improved Crop Varieties and Nutrient Management Practices in Previous Enclaves of Bangladesh**

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**Abstract :** Being detached about 68 years from the mainland, the previous enclaves' (Chhitmohal) farmers were engaged only in subsistence farming with low agricultural productivity and restricted access to inputs technology. To increase crop productivity for attaining food security by addressing soil status, the experiments were undertaken in 2017 and 2018 in three previous enclaves of Northern Bangladesh i.e. Dasiarchhara of Kurigram district; Dahalakhagrabari of Panchagarh district and Banskata of Lalmonirhat district under On-Farm Research Division, Bangladesh Agricultural Research Institute, Rangpur. The Mustard (var. BARI Sarisha-14)-Boro rice (var. BRRI dhan58)-T. Aman rice (var. BRRI dhan49) cropping pattern using soil test based (STB) fertilizer with cowdung (T1) or recommended fertilizer dose (T2) were tested against existing cropping pattern Fallow-Boro rice (var. BRRI dhan28)-T. Aman rice (var. Swarna) using farmers' practices fertilizer dose (T3) in six disperse replications at each location maintaining Randomized Complete Block design. Almost all crops yields were relatively higher in T1 followed by T2. Farmers existing pattern with local varieties and imbalance fertilizer (T3) use may be decreased the crop yield. The rice equivalent yield of T1 was 109, 103 and 95% higher than T3 and the gross margin was 164, 153 and 133% higher in T1 than T3 at Dasiarchhara, Dahalakhagrabari and Banskata, respectively. The Benefit Cost Ratio for T1, T2 and T3 were 1.99, 1.78 and 1.28 in Dasiarchhara; 1.93, 1.81 and 1.27 in Dahalakhagrabari and 1.78, 1.71 and 1.25 in Banskata, respectively. There was a remarkable decrease in mineral N, P and K in the topsoil (0-15 cm) of T3 and T2 treatments at Dasiarchhara and Dahalakhagrabari, and a generally less marked decline under the same treatments at Banskata. The same practices (T1) exhibited the greatest nutrients uptake by the test crops. The apparent balance of N, P and K was negative in most cases, where it was less negative in T1 treatment. However, from the experimentation, it is revealed that balanced fertilization (STB) and inclusion of National Agricultural Research Institutes developed improved crops varieties in cropping pattern may increase the crop productivity, farm efficiency and farmer's income in a remarkable level.

**Keywords :** cropping pattern, fertilizer management, nutrient balance, previous enclaves

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