

## INTEGRATION OF FERTILIZER AND MANURE WITH DIFFERENT WATER MANAGEMENT FOR SUSTAINABLE SOIL FERTILITY AND PRODUCTIVITY IN RICE-RICE CROPPING SYSTEM

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### Extended Summary

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#### Experiment 1:

#### Effect of various inorganic fertilizer and manure applications with different water management on yield and yield attributes of boro rice

A pot experiment was conducted at Sher-e-Bangla Agricultural University, Dhaka, Bangladesh during the period from December 2010 to April 2011 to assess the effect of various organic manure and inorganic fertilizer with different water management practices on yield and yield attributes of boro rice (BRRI dhan29). The treatment consisted of 2 factors i.e. irrigation and fertilizer plus manure. Two levels of irrigations ( $I_0$ = Alternate wetting and drying and  $I_1$ = Continuous flooding) with 8 levels of fertilizer plus manure, (as  $T_0$ = Control,  $T_1$ : 100%  $N_{100}P_{15}K_{45}S_{20}Zn_2$  (Recommended dose),  $T_2$ : 50% NPKSZn + 5 ton cowdung  $ha^{-1}$ ,  $T_3$ : 70% NPKSZn + 3 ton cowdung  $ha^{-1}$ ,  $T_4$ : 50% NPKSZn + 4 ton poultry manure  $ha^{-1}$ ,  $T_5$ : 70% NPKSZn + 2.4 ton poultry manure  $ha^{-1}$ ,  $T_6$ : 50% NPKSZn + 5 ton compost  $ha^{-1}$  and  $T_7$ : 70% NPKSZn + 3 ton compost  $ha^{-1}$ ). Results revealed that irrigation had no significant effect on the yield and yield parameters of boro rice. The treatment  $T_4$  showed the highest effective tillers  $hill^{-1}$ , plant height, panicle length, 1000- grain wt., grain yield ( $6.96 t ha^{-1}$ ) and straw yield ( $6.03 t ha^{-1}$ ) which were lowest in  $T_0$  treatment. The highest grain ( $7.13 t ha^{-1}$ ) was recorded from the  $I_1T_4$  treatment combination which was also identical to those of  $I_0T_4$  ( $6.78 t ha^{-1}$ ).  $I_0T_5$  ( $6.88 t ha^{-1}$ ),  $I_1T_1$  ( $6.60 t ha^{-1}$ ),  $I_1T_5$  ( $6.72 t ha^{-1}$ ). The lowest was ( $3.84 t ha^{-1}$ ) from  $I_0T_0$ . The highest nutrient concentrations and uptake were recorded also in  $I_1T_4$  treatment combination. The levels of organic matter and nutrient concentration were increased in the post harvest soils where manure plus inorganic fertilizer were used. It was concluded that application of  $I_0T_4$  was most favorable for improving yield and yield contributing attributes of BRRI dhan 29.

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## Experiment 2:

### Effect of various inorganic fertilizer and manure applications with different water management on yield and yield attributes of boro rice

An experiment was conducted at Sher-e-Bangla Agricultural University Research farm, Dhaka, Bangladesh during the period from December 2010 to April 2011 to study the effect of fertilizer and manure with different water management on the growth, yield and nutrient concentration of BRRI dhan28. The experiment consisted of 2 factors i.e. irrigation and fertilizer plus manure. There were 2 irrigation levels ( $I_0$ = Alternate wetting and drying,  $I_1$  = Continuous flooding) and 8 fertilizer treatment ( $T_0$ : control,  $T_1$ : 100% RDCF, ( $N_{100}P_{15}K_{45}S_{20}Zn_2$ ),  $T_2$ : 10 ton cowdung/ha,  $T_3$ : 50% RDCF + 5 ton cowdung/ha,  $T_4$ : 8 ton poultry manure/ha,  $T_5$ : 50% RDCF + 4 ton poultry manure/ha,  $T_6$ : 10 ton vermicompost/ha,  $T_7$ : 50% RDCF + 5 ton vermicompost/ha). There were 16 treatment combinations and 3 replications. Irrigation had no significant effect on the yield and yield parameters of BRRI dhan 28. The yield contributing characters and yields were significantly influenced by applied fertilizer and manure. The  $T_5$  (50% RDCF + 4 ton poultry manure/ha) showed the highest effective tillers/hill, plant height, panicle length, 1000 grain wt., grain yield (5.92 kg/plot) and straw yield (5.91 kg/plot). The higher grain and straw yields were obtained organic manure plus inorganic fertilizer than full dose of chemical fertilizer and manure. The highest grain (5.93 kg/plot) and straw yields (6.42kg/plot) were recorded from  $I_0T_5$  (Alternate wetting and drying + 50% RDCF plus 4 ton poultry manure/ha) and the lowest was found in  $I_1T_0$  (Continuous flooding + control treatment) treatment combination. The highest concentrations of grain and straw N, P, K, S were recorded in  $T_5$  treatment. The levels of organic matter and nutrient concentration were increased in the post harvest soils due to added manure plus inorganic fertilizer.