

Implementing improved agronomic management practice for yield improvement of zinc enriched rice varieties in Bangladesh



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1 Motivation & Method

Rice (*Oryza sativa* L.) is the staple food of >130 million people in Bangladesh. However, rice yield on smallholder farmers' fields is <5.7 t ha⁻¹ against an achievable 7.0 to 8.0 t ha⁻¹ grain yield. Furthermore, the popular rice varieties in the Bangladesh's markets are relatively low in nutritional quality and, therefore, unfit to meet nutritional (Zn) demands. To address this, the Nutrition in City Ecosystems (NICE) project leverages the Global Agricultural Technology Evaluation (GATE) program of the Syngenta Foundation for Sustainable Agriculture to determine under Bangladesh's production systems the effects of improved planting arrangement on the yields of Zn enriched rice varieties.

Table 1: Nutritional content of popular versus tested Zn enriched rice varieties. Source: Kader et al. (2020; 2021) & Shozib et al. (2018).

	BRRi dhan 28	BRRi dhan 84	BRRi dhan 100
Zinc (mg kg ⁻¹)	15.2	27.6	25.7
Amylose (%)	26.5	25.9	26.8
Protein (%)	8.7	9.7	7.8

Five non-replicated trials of four treatments were implemented on-farm to evaluate the yield responses of two zinc-enriched rice varieties (BRRi dhan 84 and BRRi dhan 100) under the conventional farmer practice of no path between columns compared with a wide- and narrow-row spacing with path between columns (Fig. 1) in the 2022/ 2023 Boro season in Bangladesh.

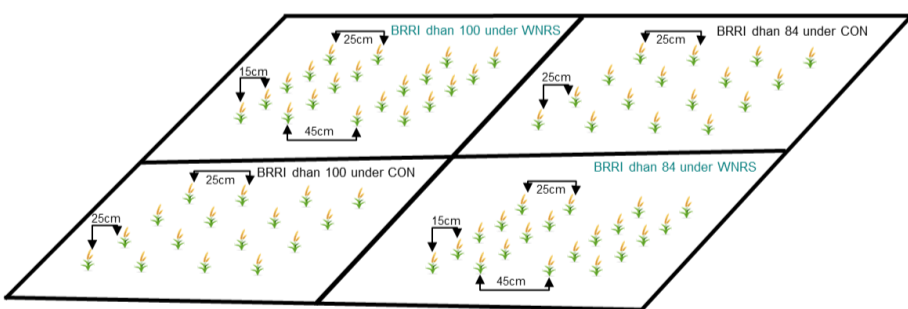


Figure 1: Plot layout of the Zn enriched rice varieties under the wide and narrow row spacings. CON: Conventional spacing; WNRS: Wide and narrow row spacing. Plot dimensions 10m x 10m.

2 Results

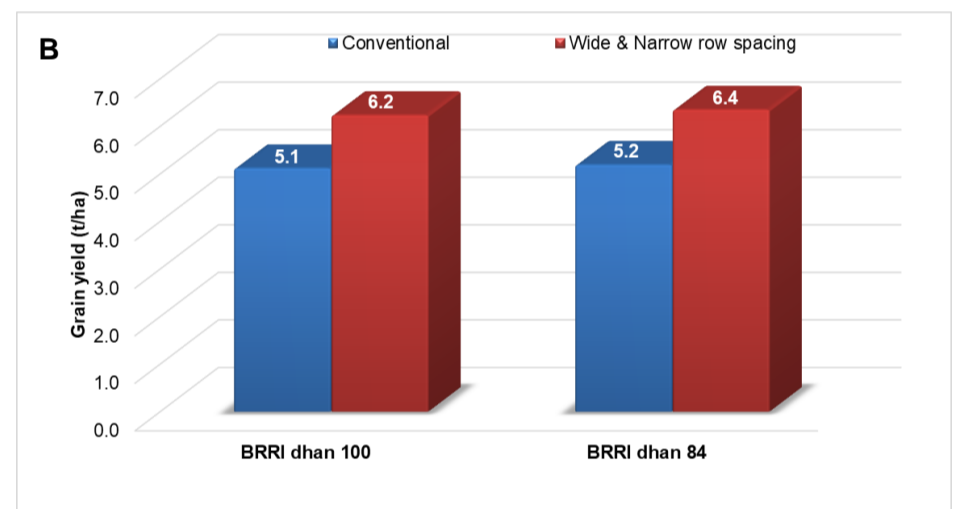
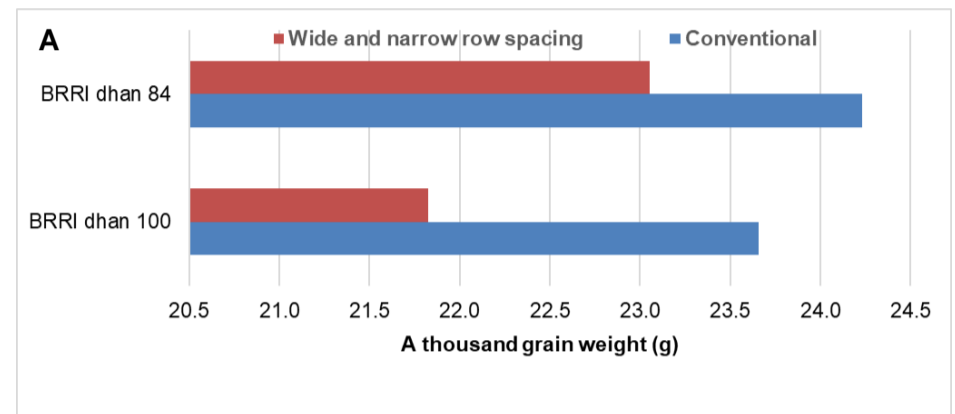


Figure 2: Effects of conventional and wide- and narrow-row spacings on rice thousand grain weight (A) and grain yields (B) of Zn enriched rice varieties - BRRi dhan 84 and BRRi dhan 100, across five fields at Rangpur Division, Bangladesh.

3 Conclusion

To improve public health and nutrition for secondary city populations, the NICE project seeks to popularize the Zn-enriched rice varieties in Bangladesh starting with the pilot cities: Dinajpur and Rangpur. This intervention requires production to meet demands and therefore the need to support farmers with the requisite agronomic management knowledge for boosting the yields of the selected Zn enriched rice varieties.

4 Contribution to Sustainable Food Systems

Our work contributes to the following 5 Sustainable Development Goals



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