Performance of wheat varieties under different tillage systems in Bangladesh

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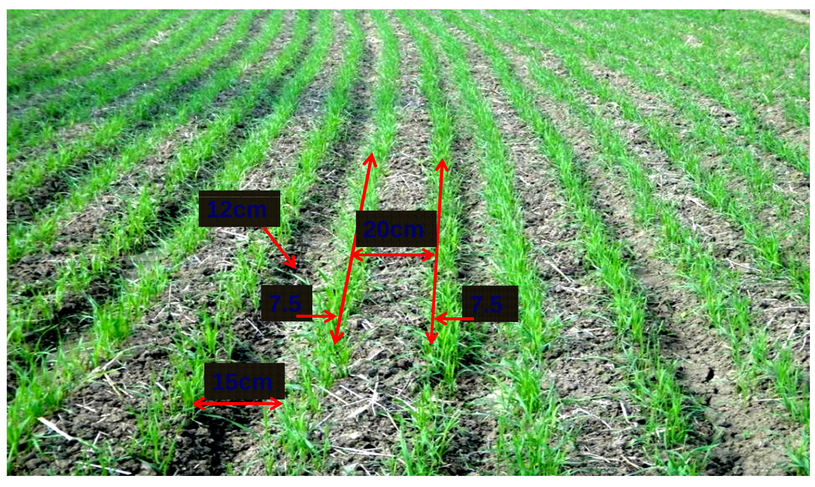
Background

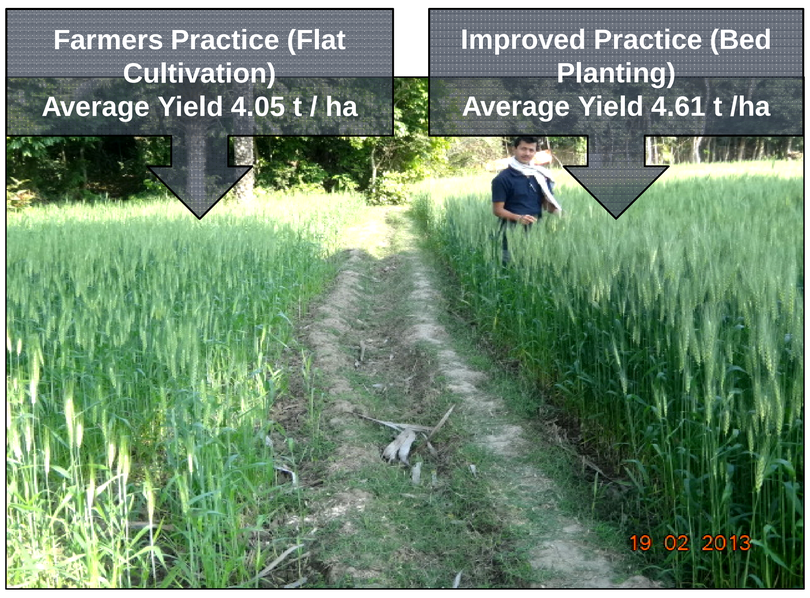
Wheat, the important winter cereal crop ranks second both in area and production after rice in Bangladesh. To meet the increasing demand for food, efforts are being made to develop improved wheat varieties and low production cost technologies with high yield potential. Raised beds technique are prepared by a single pass using a bed planter machine that simultaneously sow seeds and fertilizes two rows of wheat on top of the beds. This technique have been reported to higher grain production, as well as reduced costs by 25% as ploughing and seeding are done by mostly one passes only in comparison to 3-4 passes under conventional flat production system. Wheat sown on beds saves 30% irrigation water, provides longer spikes, maximum number of grains per spike and increases yields by 10–18% over conventional flat cultivation (Talukder *et al* 2004).

Bed preparation, seeding & fertilizer apllication simaltaneiously

Methodology

Four wheat cultivars: BARI Gom 25, BARI Gom 26, Prodip and Shatabdi were compared under two cultivation techniques: bed planting and conventional tillage. Randomized complete block (RCB) design were laid out considering nine replications under Faridpur, Rajbari and Gopalgong districts in Bangladesh and unit plot size was 400 m^2. The seeds were sown in both bed planting and conventional tillage systems. In conventional system farmers used around 150 kg/ha wheat seeds, while in bed planting the seed rate was 120 kg/ha. Recommended fertilizers doses were applied as 115-32-45-22.5-1.25 kg/ha N-P-K-S-B for both systems. The data were considering different parameters and the grain yield recorded plot wise. The collected data were analyzed using Cropstat statistical tool. The cost and return comparing bed planting with conventional tillage was also analyzed.

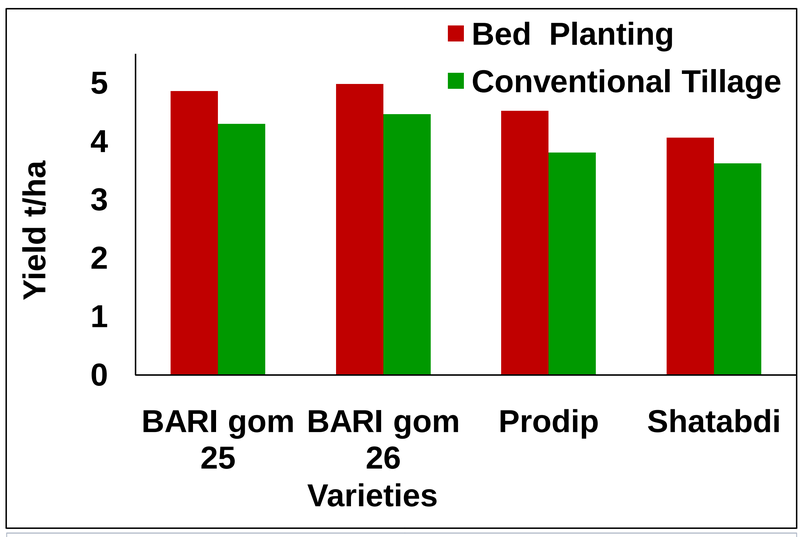




Comparison of improved Agricultural practices (Bed Planting) and Farmers Practices (Flat cultivation) in Bangladesh

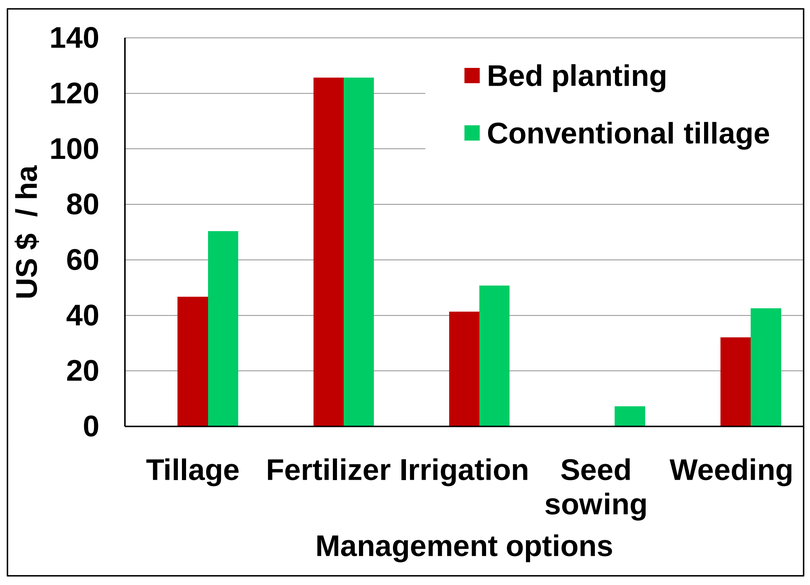
Take Home Messages

- Raised bed can decrease water consumption, increase water & fertilizer use efficiency over flat planting of winter wheat. Bed planting also offer more opportunity for mechanical weed control, reduce number of tillage, reduce incidence of lodging, reduce rat infestation & arsenic contamination.
- Flood irrigation on flat ground associated with soil degradation and improper nutrient management led to nitrate pollution of surface & subsurface water
- Bed planting consider two conservation principles: i). Include crop rotation (rice - wheat) ii). Minimum soil disturbance. Moreover, bed planting reduced the total production cost by around 30% and increased the wheat grain yield by 14% over conventional tillage



Yield performance of wheat varieties under bed planting technique and conventional flat system

- Yield contributing characters like - number of effective tiller, spike length, grain per spike and 1000 grain weight in bed planting system is comparatively higher than the conventional system



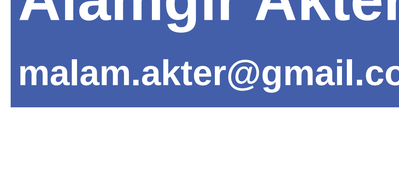
Comparison of production cost under bed planting technique and conventional tillage

Total cost (ha.) Bed Planting : 120.11 $

Conventional : 170.63 $

Cost saving under Bed Planting : 29.61 %

- Bed planting can significantly reduce rat infestation as compare to flat production system.
- Bed planting take less amount of water and less time to irrigate the wheat field.
- Bed planting has been observed to shed excess water from the field, thereby avoiding water logging better than flat-planted fields.



Bed Planter

Bed Planting wheat field

Reference

Talukder, A.S.M.H.M., Meisner, C, Kabir, M.J., Hossain, A.B.S. & Rashid, M.H. 2004. Productivity of multi-crops sown on permanent raised beds in the tropics. New directions for a diverse planet: Proceedings of the 4th International Crop Science Congress, Brisbane, Australia, 26 September–1 October 2004.

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