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Research Paper :

Impact of laser land leveler for enhancing water productivity in Western Uttar Pradesh

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ABSTRACT

Precision agriculture–based resource-conserving technologies (RCTs) in their version of laser-assisted land leveling, introduced at the farm level in the Western Uttar Pradesh of India in 2001, could examine the many issues of the intensive irrigated rice-wheat system. An attempted was made to study the potential benefits and impact of laser-assisted precision land leveling (PLL) in various crops and cropping systems under different agroecologies throughfarmers participatory researcher-managed on-farm trials. Under on-farm trials conducted in the Western Uttar Pradesh, it was found that PLL enhanced RW system productivity by 10%,with water savings of 22%. Land Leveling is one of the few mechanical inputs in intensively irrigated farming that meets the objective of achieving better crop stand, saving irrigation water and improving the use efficiency of inputs. In recent year considerable efforts have gone in developing and promoting resource conservation technology (RCTs) *i.e.* Zero tillage, bed planting etc. The performance of RCTs can be greatly enhanced through final land leveling.These studies suggest that, to sustain the intensive irrigated systems in general and the RW system of the Western Uttar Pradesh in particular, the integration of laser-assisted precision land leveling with other RCT s could be a viable option. However, the long-term effects of these alternative technologies need to be studied under varying agroecologies.

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Shrinking water resources owing to over exploitation of ground water in Western Uttar Pradesh threatens the maintenance of agricultural productivity. As a result, the water table is falling in 60% area of the state. Most of this area falls in the Western part of the state. With the inception of green revolution in the sixties, the water table started declining and the area having water table below 30 feet. depth has increased from 3% in 1973 to 60% in 2006. During 1993-2006, the average fall of water table in the Western Uttar Pradesh was 50 cm per annum. However, in some of the areas, the fall of water table is even more than 80- 100 cm per annum. Out of 819 blocks, there are 85 dark block, 214 grey blocks in the state, of which 67 dark and 86 grey blocks are in western region, 15 dark and 38 grey blocks in central region 12 dark and 90 grey block in eastern region and 1 dark block in Bundelkhand region.In Western Uttar Pradesh out of 70 blocks,the water table in 40 blocks has gone down below 50 cm depth and in these blocks,submersible pumps are being installed to replace centrifugal pumps.It is projected that by 2025 in Western Uttar Pradesh the water table depth will be below 90 cm in 66% area, below 100 cm in 34% area and below 130 cm in 7% area. Correspondingly in each district, the per cent area below 70 cm depth will be 90% in Agra and Mathura, 80 % in Ghaziabad, 70 % in Baghpat, 60% in Aligarh and Saharanpur.To arrest this dangerous trend of ground water exploitation, there is an urgent need to conserve irrigation water through various on-farm water conservation practices. Land Leveling through Laser Leveler is one such proven technology that is highly useful in conservation of irrigation water.

As per studies, a significant (20-25%) amount of irrigation water is lost during its application at the farm due to poor farm designing and unevenness of the fields. This problem is more pronounced in the case of rice fields. Fields that are not level, have uneven crop stands, increased weed burden and uneven maturing of crops. All these factors lead to reduced yield and poor grain