Sustainable Climate-Smart Agriculture (CSA) in Pakistan: A Comparative Analysis of adopters and conventional farmers

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**Abstract**

The agricultural production in Pakistan is being confronted with many issues. Climate change, conventional agricultural management practices, and increasing water scarcity is posing a major threat to agricultural production and biodiversity as well as environmental sustainability. Climate-smart agriculture (CSA) is recognized as an efficient, sustainable and feasible agricultural system that plays a vital role in addressing the potential impacts of climate change in Pakistan. First-hand information was collected from 450 farm households in 24 villages from Okara, Sahiwal and Khanewal irrigation divisions, having various wheat-based cropping systems of Pakistan. This includes rice-wheat (RW), maize-wheat (MW), and cotton-wheat (CW) cropping systems in the Lower Bari Doab Canal (LBDC) irrigation system. This study estimated and compared the financial, economic and efficiency analysis of CSA and conventional agricultural practices. It also estimated the impact of water-smart practices of the CSA, technical training and groundwater quality on agricultural production by using production function and bootstrap truncated regression. The findings of this study revealed that adopters of CSA of the wheat-based cropping systems have higher financial/economic benefits and improved resource use efficiencies compared to the conventional farmers. The findings of the study also revealed the increased efficiency of CSA adopters over other two systems in CW cropping system. The water-smart practices of CSA, access to credit, technical training, use of groundwater of varying quality, and other inputs also showed variations in the agricultural production and resource use efficiency. It has been concluded that farmers can earn more profit, save inputs (such as water) and increase their production by adopting water-smart practices of CSA. Hence the government and other relevant institutions should devise and implement policies that adequately address the importance and enhance the use of water-smart practices of CSA in Punjab and beyond.

Key Words: Climate Smart, Lower Bari Doab Canal, Resource use Efficiency, Cropping Systems, Punjab