



Agricultural Development in Punjab: An Empirical Analysis of Sustainability of Water Resources

**Chhabilendra Roul^{1*}, SK Chaudhury², Sheelabhadra Mohanty³,
Balvinder Sukla¹ and Naleeni Ramawat⁴**

¹*Amity University, Noida-201313, Uttar Pradesh, India*

²*NRM Division, Indian Council of Agricultural Research, KAB-II, New Delhi-110012, India*

³*ICAR-Indian Institute for Water Management, Bhubaneswar-751023, Odisha, India*

⁴*Amity Institute of Organic Agriculture, Amity University, Noida, Uttar Pradesh, India*

**Corresponding author E-mail: c_roul@hotmail.com*

Abstract

Sustainable management of water resources for agriculture and non-agricultural purposes warrants thorough analysis of the issues relating to depletion of ground water, irrigation water use efficiency, smart irrigation management, waterlogging due to poor drainage and flood irrigation, and suitable cropping patterns. Overexploitation of groundwater resources for use in agriculture has caused serious groundwater depletion in north-western states of India. In states of Punjab, Haryana, Rajasthan, Delhi and Western UP, the depletion of groundwater resources has increased the cost of pumping and has raised questions about sustainable groundwater supply in the long run. In the present study, effort has been made to develop composite water sustainability index (CWSI) for the state of Punjab to quantify the status of sustainability water resources in the state. Seventeen indicators crucial for sustainability of agriculture and water resources were identified for the analysis. The CWSI for the state of Punjab was calculated as 0.519, with the district-wise value varying from a minimum of 0.409 in Mansa to a maximum of 0.606 in Muktasar district. The reason for such low to moderate water sustainability in the state of Punjab was attributed to overexploitation of groundwater and improper cropping system.

Key words: Water sustainability index, Overexploitation of groundwater, Water use efficiency, Sustainability indicators