Impacts of Climate Change on Groundwater resources- Some Observations From Punjab State, India

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Climate change affects groundwater resources through changes in the timing and magnitude of recharge of aquifers, the interaction between groundwater and surface waters and water withdrawals. Identification of these impacts is important for long term water resources management, especially in semi arid regions where water resource is the key to economic development. Punjab which is the food bowl of India shows greater depletion of groundwater resources due to climate change as during the past two decades, significant water table decline has been observed in most parts of Punjab state . Out of 138 blocks in the state 103 blocks are over-exploited, 5 blocks are critical and 4 blocks are under semi critical condition. Study of rainfall data of the Punjab State for the period 1970 to 2008 has revealed that the mean annual rainfall for the State shows decreasing trend. Against the mean annual rainfall of 660 mm, the state received 477, 390, 392, 463, 315, 375.2 and 565 mm in the year 1998, 1999, 2000, 2001, 2002, 2004 and 2005 respectively. On the other hand, water levels have been depleting at an alarming rate of 30-90 cm/year. During the past 28 years (1975 – 2003) there is a decline in the fresh groundwater areas of the State. Out of 50,362 Sq.km area of the State, 39,000 Sq.Km area (78%) exhibits a decline in water levels, covering major part of the State which includes most of Amritsar, Gurdaspur, Jalandhar, Ludhiana, Moga, Faridkot, Sangrur, Fatehgarh Sahib, Patiala, Faridkot, major part of Mansa and northern part of Ferozepur and Bathinda districts. The fall in water levels is between 4 to 16 meters .Climate modeling studies further predict decrease in rainfall for Northern India. To combat the changing rainfall pattern and to control depletion of water levels, there is a need to take water conservation measures in Agriculture, Industrial and Domestic sector, to cut the demand and to enhance the recharges which are highlighted in the paper.

Keywords: Groundwater, Climate change, Developmental blocks, Water level, Punjab etc.