

Accelerating Rate of Groundwater Depletion & Deteriorating Water Quality in Punjab

Ranjit Singh

Headmaster, Government High School, Chak Ram Singh Wala, District Bathinda, Punjab, INDIA

ABSTRACT

Groundwater depletion continues to be a cause for concern in Punjab as the State is among three states in India where groundwater extraction is more 100%. The nation average is 60%. The recently released Ground Water Resources Assessment for 2022 points the situation in Punjab being the most critical, with the agrarian state being the worst off in extracting underground water at 166% of its extractable groundwater resources.

Keywords: Groundwater depletion, Water Resources, Central Ground Water Board, Punjab

INTRODUCTION

A 2020 block-wise groundwater resources assessment by the Central Ground Water Board (CGWB) found that most of the districts in Punjab had over-exploited the groundwater levels. In some districts, the groundwater level was marked as critical. Groundwater extraction in Punjab has already reached 150-200 meters in most places in central Punjab. If the present depletion continues, Punjab's groundwater is expected to drop below 500 meters by 2039, as per CGWB. Experts warn of a major threat to India's food security if Punjab's groundwater goes dry. Phasing out paddy and remodeling British-era canal systems to improve canal-based irrigation techniques are being recommended as possible solutions.

METHODOLOGY

We employed a mixed-methods approach in this study to combines elements of quantitative research and qualitative research. we pay attention to the variables such as Measurement and modelling are crucial for better understanding the groundwater depletion, implications, and sustainable management. Water level data was collected from Department of Agriculture and Farmers' welfare, Punjab, central ground water board & ground water year book of Punjab state.

MODELING AND ANALYSIS

It has come to light that due to indiscriminate extraction of water from the ground, Punjab will become barren in the next two decades. In fact, the study report of the Central Ground Water Board has said that by the year 2039, the groundwater level in Punjab will drop to 1000 feet, which has reached 450 feet today. According to the report, 78 percent of the area of Punjab has become a dark zone and only 11.3 percent of the area is safe. In such a situation, the land of five rivers will cease to exist. Let it be known that the monitoring committee of the National Green Tribunal (NGT) has also recently announced that by the year 2039, the underground water of Punjab will go below 300 meters. In the year 2000, groundwater was available in the state at 110 feet and after two decades it has now reached 450 feet. The central and southern

districts of Punjab – Barnala, Bathinda, Fatehgarh Sahib, Hoshiarpur, Jalandhar, Moga, SAS Nagar, Pathankot, Patiala and Sangrur – are the most affected, where the average annual rate of decline in groundwater level is 0.49 m. is estimated to According to the block-wise groundwater resource assessment conducted by the Central Ground Water Board, most of the blocks in all 14 districts of Malwa region, except Sri Muktsar Sahib district, have experienced massive withdrawal of groundwater. It also includes 75 villages of Sangrur, Malerkotla and Barnala districts. According to the status of the entire Punjab presented in



the board's report, there has been unnecessary misuse of ground water in 109 blocks i.e. about 78 percent of the area and this area has become a dark zone. Apart from this, in 4 percent of the area, the ground water situation remains critical and the level has fallen by 400 to 500 feet. 6.7 percent of the state's area is where the ground water table has gone below 300 feet. Various experts have identified paddy cultivation as a major reason for the rapid depletion of ground water. Due to the nutritional importance of the paddy crop, this crop was promoted during the Green Revolution in India in the seventies. Due to the hard work of farmers, the revolution brought about by agricultural discoveries and expansion, Punjab, the owner of only one and a half percent of the country's area, today produces twenty percent of India's wheat and twelve percent of paddy. While the cultivation of paddy filled up the food reserves of the country, it also boosted the economic condition of the farmers. The mud houses of the farmers were blessed with solid bricks and the trumpets of the farmers of Punjab began to speak in the social and political sphere. Due to the continuous running of the above phenomena, time went by. Punjab, once considered to be the most fertile region in the world, is standing at a dangerous juncture today. The paddy crop which brought prosperity to the farmers' homes is today considered to be the biggest reason for the wastage of natural resources in Punjab. Due to indiscriminate use of groundwater for paddy cultivation, non-recommended agricultural techniques, stagnation in agricultural research and lack of adequate agricultural expansion,

today the groundwater level of Punjab has reached an unbearable level. Poisons have dissolved in water, air and soil. Every year, during the monsoon season, around 13 lakh tube wells of Punjab run together day and night to extract water from the ground. Punjab, which contributes heavily to the central pool of the country, has never been given any special package by the country's policy makers to replenish its natural resources. According to the data obtained, the amount of usable resources of underground moving water in Punjab is about 24.433 million cubic meters while the amount of water extracted from the ground every year in Punjab is more than the usable resources i.e. 31.162 million cubic meters.

KIDNEY FAILURE, CANCER AND MENTAL ILLNESS ARE RAMPANT.

Along with the decreasing water level, there has also been a decrease in the availability of good water in Punjab. Due to excessive use of fertilizers and pesticides, metals such as nitrate, arsenic, and cadmium are being found in the ground water in excess of the minimum tolerable amount. Currently, out of 12423 villages of Punjab, 11849 villages are not meeting the drinking water standards. As a result, cancer, kidney failure, mental illness are rampant in Punjab today. Along with wheat and paddy cropping cycle, political interference, increasing urbanization, increasing population, lack of awareness and modernization of houses are also responsible for this state of groundwater in Punjab. Submersible motors installed in homes and water supplied through local bodies in cities are misused on a large scale. Three crore liters of water is used daily in Ludhiana city alone. It is clear from these facts that Punjab, which is struggling with the crisis of underground water, is standing at the point where the road to the desert starts. While the natural resources of Punjab are in danger today, the farmer who is living the illusion of prosperity after the Green Revolution is also facing a serious economic crisis. From deepening boreholes to submersible motors, under the burden of heavy expenses, paddy cultivation has become a compulsion for the farmer today. Coming is the main need of the hour but the success of crop diversification also depends on net profit, minimum support price and safe marketing as in other alternative crops like paddy. Along with these, instead of planting paddy through greenhouses, direct sowing of paddy is also done from paddy where it costs from 1500 rupees to 2000 rupees. As production costs are low, direct sowing of paddy is also considered environmentally friendly. A large amount of methane gas leaks through the standing water in paddy fields planted through paddy fields and this gas is considered to be the second biggest cause of global warming after carbon dioxide gas. This is the reason that in the months of June-July in the whole of North India, green house effect is seen due to stagnant water in the paddy and the entire region faces heat and humidity. According to scientists, the above temperature can be reduced up to 42 percent by direct sowing of paddy. Recommended use of herbicides, continuous monitoring of the field and control of micronutrient deficiency at the right time can definitely lead to success in direct seeded paddy where full yield can be achieved. Nature's precious treasures can contribute to save water. In view of the explosive situation of ground water in Punjab, it is very important to adopt new agricultural techniques such as judicious use of ground water, crop diversification, direct seeding of paddy and prevent indiscriminate use of ground water in non-agricultural areas under the strategy of sound management. is necessary There is also a need to conserve about 1200 million cubic meters of water that is wasted every year during the rainy season in the state. By adopting techniques like water harvesting and artificial recharging, if the above rainwater is conserved, the ground water level can improve considerably. Today, it is the duty of every well-meaning resident of Punjab to contribute his or her valuable contribution to the preservation of the freshwater resources of the inherited land. If the conditions continue to be as dangerous

as they are now, the time is not far when the water will be out of our reach and our land, known as the five waters, will become barren. History will never forgive us for this oversight.

The land of five rivers will become barren.

RESULTS AND DISCUSSION

Our assessment concludes that the Punjab, In sustaining agricultural production and food security, Punjab has already overused and depleted its good quality groundwater resources. The increasing dependence on groundwater resources has led to widespread decline in water. Understanding groundwater overexploitation/use is complex and very much influenced by numerous factors. The state of development and management of groundwater resources in Punjab is a matter of concern for the future of agriculture in the state. One of the biggest reasons for the groundwater depletion trends across the region has been attributed to high irrigation requirement, which is dependent on the cropping pattern and rainfall.

CONCLUSION

Measurement and modelling are crucial for better understanding the groundwater depletion, implications, and sustainable management. Given that India is the frontrunner in the massive groundwater extraction, we need to identify the areas that need enhancement for the better understanding of the groundwater storage variability and groundwater recharge. In-situ and satellite-based monitoring play a vital role in examining the role of natural climate variability. subsidized or free power is responsible for the rapid depletion and overexploitation of groundwater resources. There is an urgent need to check the decline in water table in the central zone by reducing the groundwater demand or increasing the groundwater supplies. The groundwater demand can be reduced by adopting efficient irrigation practices/technologies, i.e., micro irrigation, bed planting, laser leveling zero tillage, crop diversification, and others. The groundwater potential can be increased by constructing various types of checking structures across the vast network existing but defunct drains, renovating village ponds to increase their recharging capacity and maintaining the recommended height of bunds in paddy fields to store maximum rain water.

REFERENCES

1. <https://www.nwda.gov.in/upload/uploadfiles/e-book/S-2/Groundwater-monitoring-resource-assessment.pdf>
2. <https://cgwb.gov.in/cgwbpm/public/uploads/documents/17032379061237103626file.pdf>
3. <https://cgwb.gov.in/cgwbpm/publication-detail/25>
4. <https://www.cgwb.gov.in/cgwbpm/public/uploads/documents/1688368417412174017file.pdf>
5. <https://sansad.in/getFile/annex/262/AU883.pdf?source=pqars#:~:text=As%20per%20the%20Dynamic%20Ground,uses%20is%20about%2028.02%20BCM.>
6. WWAP (World Water Assessment Programme). Managing Water Under Uncertainty and Risks. The United Nations World Water Development Report 4; UNESCO: Paris, 2012.
7. Sharma, D.; Bharat, A. Conceptualizing risk assessment framework for impacts of climate change on water resources. *Curr. Sci.* 2009, 96, 1044–1052.
8. Rodell, M.; Velicogna, I.; Famiglietti, J.S. Satellite based estimates of groundwater depletion in India. *Nature* 2009, 460, 999–1002.
9. Kaur, S.; Lubana, P.P.S.; Aggarwal, R. Groundwater management for adaptation under changing

climate conditions in Indian Punjab. *J. Water Clim. Change* 2012, 4(1), 38–51.

10. Buchanan, S.; Triantafilis, J. Mapping water table depth using geophysical and environmental variables.
11. Hira, G.S., S.K. Jalota and V.K. Arora (2004), Efficient Management of Water Resources for Sustainable Cropping Pat
12. Khepar, S.D.; Sondhi, S.K.; Chawla, J.K.; Singh, M. Impact of soil and water conservation works on ground water regime in Kandi area of Punjab. *J. Soil Water Conserv*