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AQUIFER OVEREXPLOITATION IN PUNJAB

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Introduction

Punjab, a north-western state of India covers an area of 50,362 Sq. Km which comprises of 1.54% of total geographical area of the country. Though, covering a minuscule geographical area, it is still the largest contributor of wheat with 55% and second largest contributor of rice with 42%. Being an agricultural state, Punjab has its 85% of total area under cultivation which resultantly leads to an over-exploitation of water resources, Viz. Rivers, canals and tube-wells. There are 28 tube wells per sq. km. in Punjab and according to the Central Ground Water Board, 97% of total extracted groundwater is utilised in irrigation.ⁱ

Hara Inquilab (Green revolution) of 1960s that brought great prosperity to the Punjab's agriculture industry once, has emanated some serious consequences namely ground water shrinkage and deterioration of soil. In a recent report by the Punjab government, it was explicated; only 22 out of 138 blocks of the state (21% of the net areas) were in a safe category whereas all other blocks were in critical (5 blocks), semi-critical (4 blocks) and over exploited (103 blocks) categories.ⁱⁱ In 2019, NitiAayog, in a report specified names of 21 cities of the country that could face water extinction by 2020 and out of these 21 cities; four cities were Amritsar, Ludhiana, Jalandhar and Patiala. It is explicitly spelled out by the Central Ground Water Board that the *net annual ground water* availability of the state is 21.44 BCM (Billion Cubic Metres) however *annual extracted ground water* measures up to 35.78 BCM out of which, 1 BCM is utilised in domestic purposes and 0.20 BCM in other industries.ⁱⁱⁱ Thus, the statistics lucidly show that the aquifer exploitation is transpiring in the state.

Major reasons for the ground water crises

- **Power subsidies and aquifer exploitation**—Until 1990s, 42% cultivated area of the state was irrigated by the canals but when power subsidies were introduced, it gotshranked to 21%. The number of tube wells surged up to 14, 00,000 in 2015-16 from 1, 90,000 in 1980. Whilst there is no properly established apparatus to recharge water, these tube wells are just being used to extract fresh water, beyond its every limit.
- **Wheat and Paddy pattern**—Gone are the days, when diverse crops were nurtured in the state. For few decades, there have been only two main crops; wheat and paddy that are being yielded by the farmers. Only few farmers sow maize, pulses and other vegetables since there is no specified MSP (Minimum Support Prize).^{iv} Every statistic shows that paddy gulps much greater water than all the aforementioned crops.
- **Downfall in annual average rainfall** – Studies have shown that the annual average rainfall has declined in many parts of the state, plainly leading to utilisation of tube wells for irrigation, resulting in further depletion of water table.^v

Actions by the Government

Beside some unavailing programmes, schemes and legislation, the state failed to lead the way for any concrete scheme to check the depletion of the water table and inspire sustainable use of water in agriculture industry. As Comptroller and Auditor General of India (CAG) observed that the state failed to act according to the recommendations of Central Ground Water Board (CGWB).^{vi} The major recommendation made by CGWB was; there should be 4.55 lakh groundwater recharge apparatuses installed in varying parts of the state yet only 103 said apparatuses have been found. Some of the legislation and schemes launched by the government to check the over-exploitation of groundwater are:

- **Punjab Preservation of subsoil Water act, 2009** – this act was formulated to avoid the farmers from sowing rice before 10th May and transplanting paddy before 10th June. Before this legislation, the farmers sowed and transplanted paddy in entirely dry weather conditions and had to depend totally on tube wells for irrigation, thus pressurising ground water more.

- **Crop diversification scheme** – Crop diversification has always been aimed by the researchers and agriculturists since water crises arose in Punjab. Though, nothing much has been procured by any such scheme yet there has been implementation and trials being done by different agencies. In 2014, Rs. 500 crore were allocated to the immediate scheme, to promote the cultivation of maize, pulses and vegetables aiming at improving soil fertility and checking the burden on ground water resources by preventing water guzzling crops.
- **PaaniBachao, Paisa Kamaoyojana** – This scheme launched by PSPCL (Punjab State Power Co. Ltd.) is based on rewarding the farmers with direct monetary benefits for saving the units, rewarding Rs. 4 per unit. In the first year of the scheme, 173 farmers saved 1.75 lakh units earning Rs. 7 Lakh and the number of farmers enrolling for the present scheme is escalating rapidly. Though the project was experiment based, but the statistics elucidate contrariness. Thus, the lesser the usage of tube wells, the lesser extraction of water would be there.^{vii}
- **Tandrust Punjab** - This was a pilot project of 2019, aimed to promote drip irrigation in the state by irrigating 1000 acres of maize with drip irrigation. The maize cultivation has been on decline for many years, therefore the govt. and the PAU decided to try the irrigation apparatus on the maize crop.

Prime suggestions

- **MSP on other crops** – Crop diversification is the foremost need of the hour, if the present mono-cultivation is continued for another decade, desertification of Punjab is certain. And diversification can only be dreamt of, when farmers are provided with the appropriate Minimum Support Prize on different crops, viz. pulses, maize, vegetables or cotton.
- **Use of micro-irrigation (drip and furrow irrigation)** – Most prominent micro irrigating process is the drip irrigation. The major kinds of drip irrigation systems are; point source emitters, in line drip emitter, basin bubbler and micro spray sprinkler. This irrigation apparatus is the most efficient way of irrigation as the water is provided drop by drop that is instantly soaked by the soil and none evaporates and is directly supplied to the roots, thus this process is 80-90% efficient.^{viii}

- **Village ponds** – Using ponds for irrigation is a conventional but an efficient way of irrigation. These ponds are being levelled since there is no requirement of a pond when the irrigation can be done by the tube wells. But renovation of these ponds is much needed, as these ponds have many ecological benefits, most importantly, they work as natural reservoirs for rain water, which can later be used for irrigating crops.
- **Efficient Rooftop Rainwater Harvesting** – Punjab's soil and water conservation department has planned to invest 213 crore in rainwater harvesting and recharging. Such projects have been launched for many years but their implementation and productivity was never adequate. Thus, more efficiency is the foremost requisite of these times, when water table is declining at such inflated rate.

So, these were some of the basic suggestions, which can aid in checking the groundwater shrinkage in the state.

References

ⁱ Rita Pandey, *Groundwater Irrigation in Punjab: Some Issues and way forward*, (2014)

ⁱⁱ Punjab overexploiting groundwater resources, available at <https://www.tribuneindia.com/news/punjab/centre-punjab-overexploiting-groundwater-resources-40853> (last accessed on 21-05-2020)

ⁱⁱⁱ Ground water scenario of Punjab, available at http://cgwb.gov.in/gw_profiles/st_Punjab.htm (last accessed on 20-05-2020)

^{iv} Falling groundwater levels driving farmers in Punjab to move away from paddy, available at <https://economictimes.indiatimes.com/news/economy/agriculture/falling-groundwater-levels-driving-farmers-in-punjab-to-move-away-from-paddy/articleshow/71341938.cms>, (last accessed on 21-05-2020)

^v New strategies needed to conserve groundwater in Punjab, available at <https://timesofindia.indiatimes.com/city/ludhiana/new-strategies-needed-to-conserve-groundwater-in-punjab/articleshow/70120612.cms>, (last accessed on 21-05-2020)

^{vi} Water audit in Punjab, available at <https://www.tribuneindia.com/news/editorials/water-audit-in-punjab-45003>, (last accessed on 21-05-2020)

^{vii} Available at <https://www.gktoday.in/answers/how-the-paani-bachao-paise-kamao-of-punjab-checks-depletion-of-underground-water/>, (last accessed on 21-05-2020)

^{viii} Drip Irrigation as the Most Efficient Irrigation System Type, available at <https://blog.agrivi.com/post/drip-irrigation-as-the-most-efficient-irrigation-system-type>, (last accessed on 21-05-2020)

