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ANALYSIS

Status of Ground Water in Punjab – A Temporal Analysis

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ABSTRACT

The basic aim of this article is to shed light on the contemporary status of groundwater in Punjab. A Spatio-Temporal study has been made to understand the mosaic of groundwater usage. For analyzing the ground water status; secondary data is used to prepare maps and graphs. Choropleth mapping method is used for drawing maps to show change in maximum ground water depth that has taken place from 2002 to 2012. Groundwater is the most significant source for water supply in the state. Most of the domestic, agricultural and industrial water requirement is met with ground water. The south-western districts of the state are served by surface water and rest of the region receives water supplies from tube wells which tap shallow and deeper aquifer system. It has been identified that ground water resources are under great pressure and practice of over mining is on rise pointing towards more grave conditions that may occur in the coming times. The government and the farmers are fully conscious about the pathetic condition of aquifers in the state and government has taken several remedial measures to ensure sustainability in ground water usage.

Keywords: Groundwater, Aquifer, Green Revolution, Water Logging.

1. INTRODUCTION

Once pioneer in Green revolution Punjab is now crippled with bulk of environmental problems arise due to agricultural intensification and crop specialization. Some of these are groundwater quality deterioration, groundwater overdraft, loss of soil fertility, water logging etc. Injudicious use of natural resources has brought it at the verge of barren lands. Groundwater is the most significant source for water supply in the state of Punjab. Most of the domestic, agricultural and industrial water requirement is met with ground water. The south-western districts of the state are served by surface water and rest of the region receives water supplies from tube wells which tap shallow and deeper aquifer system. According to Dynamic Ground Water Resources of India Report (2011) by Central Ground Water Board, Punjab has a net annual ground water draft of 34.88 bcm, exceeding net annual replenishable groundwater availability of 20.32 bcm. Ground water quality deterioration is attributed to faulty waste disposal system, municipal wastewaters and surface runoff containing agro-chemicals from agricultural fields. Irrigational uses can directly be adjudged as the major culprit behind the over and ruthless drafting of water in Punjab because about 98 percent of groundwater is consumed in agricultural utilities and only remaining 2 percent is consumed by Industrial and other domestic activities. The traditional diversified agricultural system of Punjab is no more in practice.

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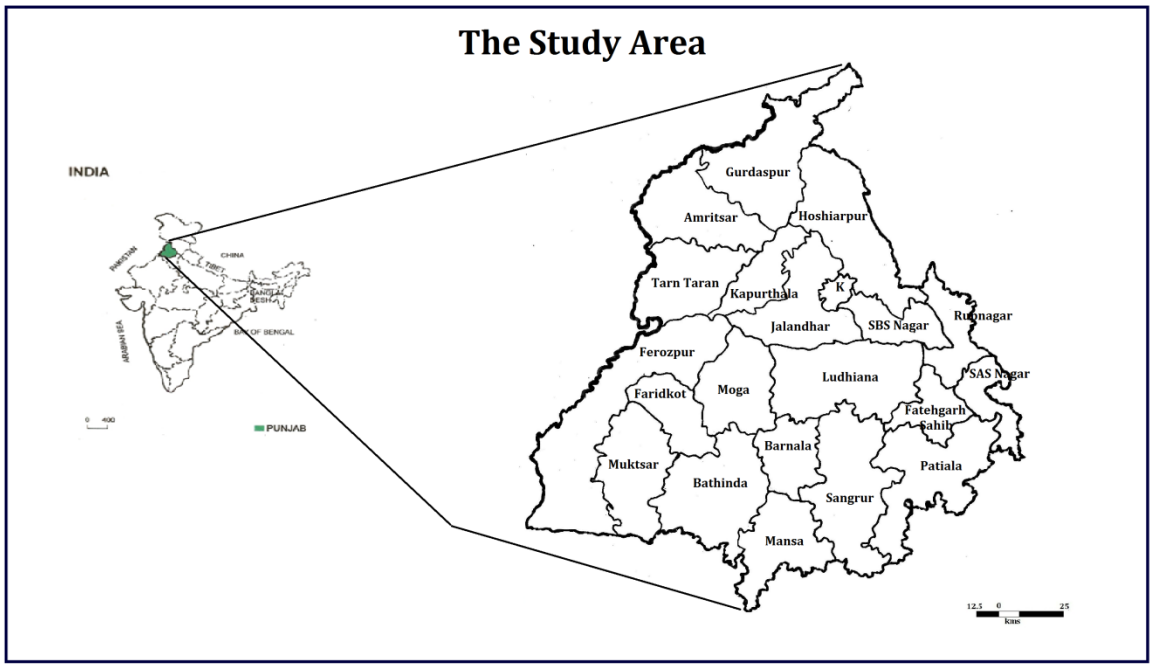

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The below given table and bar graph shows the spatial variation that took place in the maximum ground water depth over ten years from 2002 to 2012 in Punjab.

Pre & Post Monsoon District Wise Maximum Groundwater Depth in Punjab

S.No	Districts	2002	2012	Change	2002	2012	Change
1	Gurdaspur	17.89	18.77	0.88	17.77	18.64	0.87
2	Amritsar	22.08	23.50	1.42	22.35	22.90	0.55
3	Tarn Taran	20.75	19.50	-1.25	20.48	20.50	0.02
4	Kapurthala	18.93	30.00	11.07	16.93	32.05	15.12
5	Jalandhar	24.06	32.80	8.74	23.90	32.60	8.7
6	S.B.S Nagar	52.00	29.32	-22.68	***	29.32	****
7	Hoshiarpur	65.59	23.30	-42.29	65.62	22.75	-42.87
8	Rupnagar	26.28	18.68	-7.6	26.43	18.28	-8.15
9	SAS Nagar	20.70	19.75	-0.95	20.95	21.05	0.1
10	Ludhiana	19.71	30.92	11.21	20.08	31.14	11.06
11	Ferozpur	14.45	9.65	-4.8	14.75	9.80	-4.95
12	Faridkot	10.67	16.40	5.73	11.62	18.10	6.48
13	Muktsar	8.23	5.23	-3	8.38	5.35	-3.03

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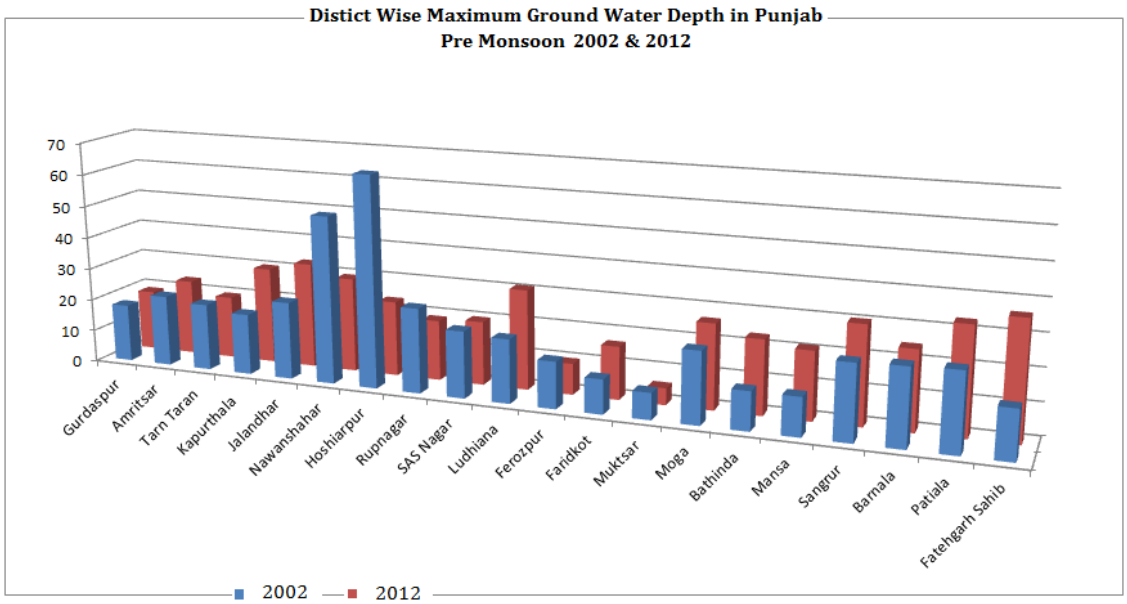
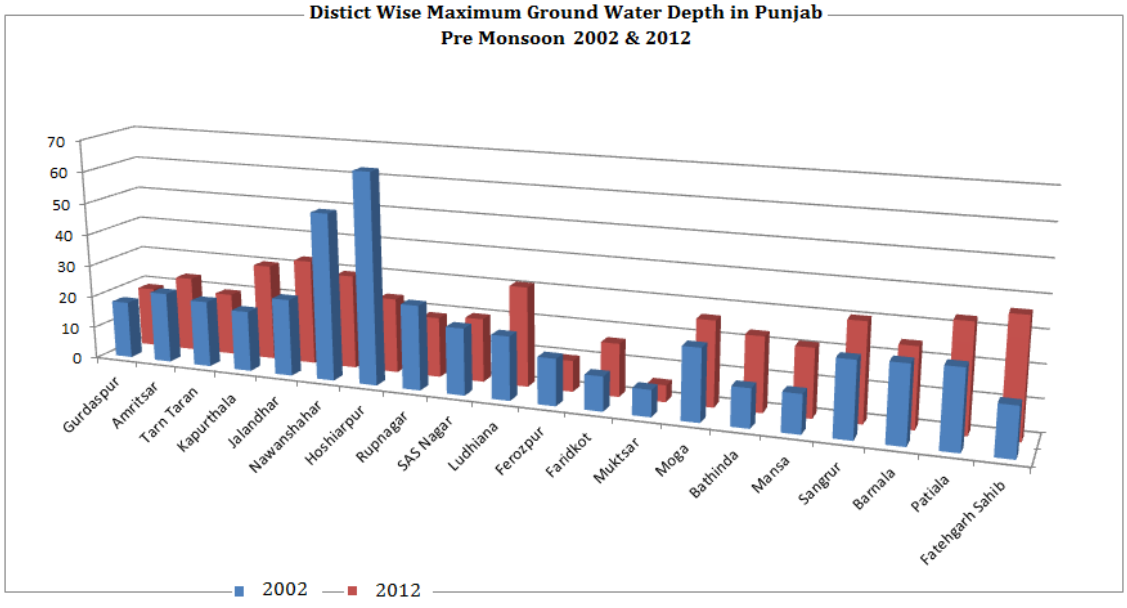
14	Moga	22.20	26.30	4.1	23.10	28.25	5.15
15	Bathinda	11.95	23.00	11.05	12.46	25.50	13.04
16	Mansa	11.90	21.10	9.2	12.80	22.30	9.5
17	Sangrur	23.25	30.25	7	24.70	29.80	5.1
18	Barnala	23.75	24.50	0.75	24.85	23.90	0.95
19	Patiala	24.20	32.99	8.79	22.45	34.70	12.25
20	Fatehgarh Sahib	15.17	36.20	21.03	13.82	34.40	20.58

Source: Statistical Abstract of Punjab 2012





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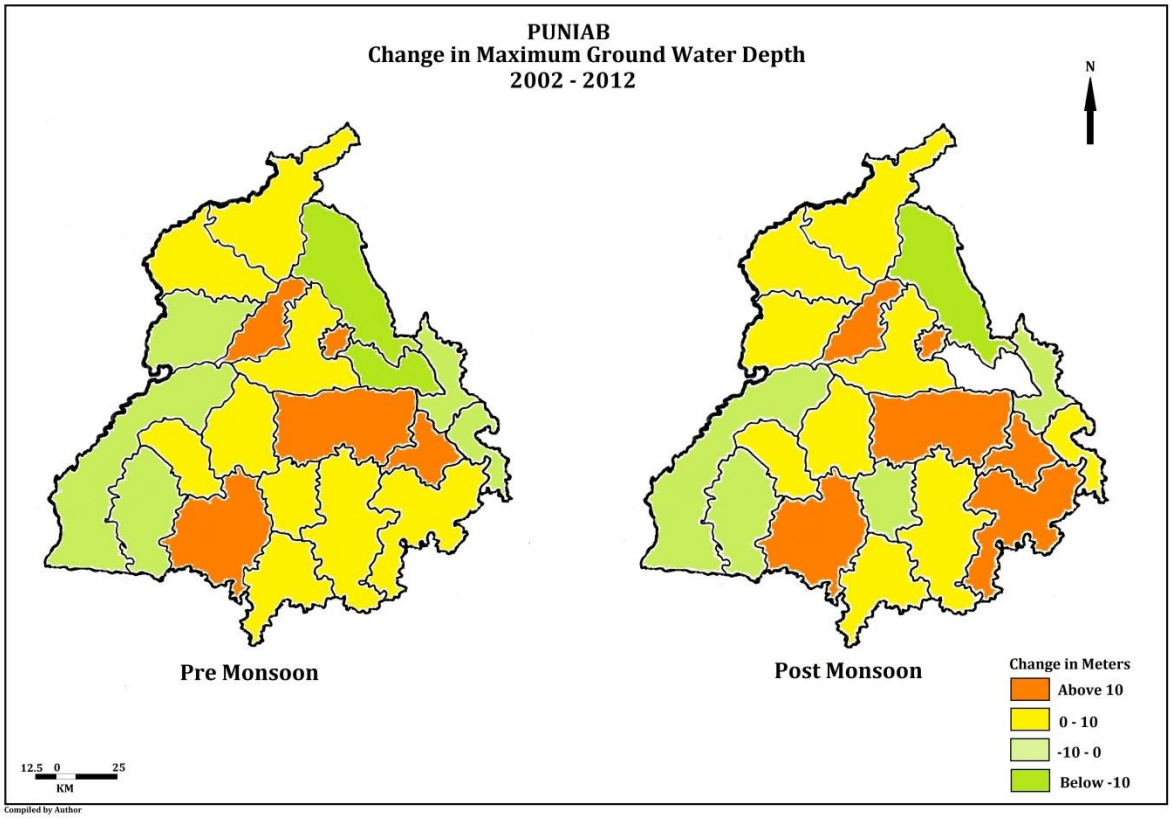
Some districts have shown a considerable rise in maximum ground water depth, where as some districts have witnessed a sharp decline. Maximum increase in maximum ground water depth is recorded in Fatehgarh Sahib followed by Ludhiana and Kapurthala. Hoshiarpur has witnessed maximum uplift in maximum ground water depth where in 2002 ground water depth reached up to 65.59 and 65.62 meters below ground level in pre and post monsoon season respectively. In 2012 these levels recovered and reached at 23.30 and 22.75 meters below ground level respectively. In addition S.B.S Nagar, Ferozpur, Tarn Taran, Rupnagar, S.A.S Nagar, Barnala and Muktsar have recorded uplift in maximum groundwater depth. These spatial variations in ground water depth are subjected to unevenness in agricultural operations, population growth, urban sprawl and industrial development.



Above shown map represents the change in maximum ground water depth that has taken place during 2002 to 2012. Four categories have been made to show change in maximum ground water depth. It is clear that central, southern, north-western and south-eastern Punjab has witnessed maximum fall in ground water levels. If we look at the spatial pattern of population, Agricultural development, Industrialization and Urbanization than we find that these areas are relatively more populous, agriculturally intensified and relatively more industrialized than other districts. Also the area under rice cultivation is greater under these districts. Bad quality ground water is the cause behind less extraction of ground water in the south-western parts, where as in North –Eastern districts the cause of less extraction are local topography, relatively heavy rains and less area under rice cultivation.

2. CONCLUSION

On the basis of above discussion it can be concluded that ground water resources in Punjab are under a great pressure. A massive change in levels of ground water has been recorded in various parts. A direct relationship is identified in levels of development and ground water depletion, it means greater the development greater is the depletion of ground water resources; as in case of Ludhiana, Bathinda, and Jalandhar etc. Transformation in agricultural practices is the most highlighted factor for aquifer degradation, in addition unplanned urban sprawl; population pressure and Industrial growth are the other contributing factors. The changing rainfall pattern and mismanaged canal system has also added to the problem positively. The State Government and farmers are fully conscious of depleting groundwater table and despite the fact that Punjab government has announced subsidies to grow other crops than paddy; the area under paddy cultivation is not dropping. The lack of MSP for other crops is the major hindrance in increasing area under other crops. The need of the hour is to put a stop on the present crop culture and move towards the traditional system of diversified agriculture. In order to support this process government should help the farmers by providing them proper marketing facilities and remunerative prices for other crops so that farmers be sure about the proper returns of their hard work and appropriate profits of their Produce. I would say that Punjab needs a concrete policy to tackle the challenge of reducing burden on groundwater and make agriculture sustainable.

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