

GROUND WATER CELL

Ground Water Cell (GWC) of Department of Agriculture, Punjab came into existence in the year 1970. GWC was created to promote the minor irrigation programmes in the state, monitor the water level behaviour and prepare the ground water estimates for systematic planning of the exploitation of the ground water resources. GWC is equipped with vital time series data collected over the years. The field work of GWC is carried out by the field staff posted at district level (Assistant geologist). Geologist / Hydrologist at the headquarter supervises the field work under the overall guidance of Joint Director of Agriculture (Hydrogeology) Ludhiana checks the ground water level and water quality of the District Ludhiana. At Ludhiana, one Assistant Geologist is working in this section for monitoring the water table by recording the values from various Government tube-wells as well as other sources.

Hydro-geologically, the state of Punjab can be divided into three zones namely Kandi Zone (Sub-mountainous), Central Zone (Central Plains of Punjab) and South-West (SW) Punjab (Plains in SW Punjab). Installation of tube-wells in the Kandi Zone is difficult due to sub-mountainous topography, occurrence of boulders and deep water level conditions. The average depth of the tube-well wherever possible is about 150m or so. Cumulative thickness of the water bearing aquifers is comparatively poor.

In Central Punjab aquifers occur at shallow depths. By and large the ground water quality in this zone is fit for irrigation purpose. The average depth of shallow tube-wells in the central zone varies from 30m to 50m. The ground water resources in the central zone are by and large over-exploited. Ludhiana district lies in the Central Punjab Zone by hydro-geologically.

The native ground water in SW Punjab is saline in nature. The ground water in this zone is un-fit to marginally fit for irrigation purposes. Thus, only limited exploitation of the groundwater resources has taken place in this zone and as a result the water levels have been steadily rising.

GWC performs following functions in the district:-

- GWC observes the pre and post monsoon Ground Water Level behaviour through a network of 600 observations wells and Peizometer tubes throughout the state.
- GWC carries out the work of ground water quality monitoring by collecting the ground water samples from Tube-wells and sent these to the Chandigarh laboratory for analysis.
- On the basis of water level data, pre and post monsoon water table depth maps are prepared.
- On the basis of Ground water quality, ground water quality maps of the year are prepared.
- GWC also work on the Tube-well Inventory, on the basis of which the discharge of the Tube-well (Electric / Diesel) and water balance is calculated.
- Under CSA cum SAC, the officer personally has to visit the factories and check that the factory pollutes the Ground Water / agricultural land or not.

- Under the World Bank Project the Agriculture and Irrigation Department install the Peizometer tubes
- Under this Project the laboratories will be upgraded with the latest technology

BLOCK WISE GROUND WATER BALANCE

S. No	Block	Stage of G/W Development (%)	Significant decline in pre - monsoon water table	Significant decline in post- monsoon water table	Categorization (safe/semi-critical/critical/over exploited)
1	Ludhiana I	178	Yes	Yes	Over-Exploited
2	Ludhiana II	158	Yes	Yes	Over-Exploited
3	Machiwara	104	No	Yes	Over-Exploited
4	Samrala	177	Yes	Yes	Over-Exploited
5	Khanna	194	Yes	Yes	Over-Exploited
6	Doraha	96	Yes	Yes	Critical
7	Dehlon	117	Yes	Yes	Over-Exploited
8	Pakhawal	187	Yes	Yes	Over-Exploited
9	Sudhar	159	Yes	Yes	Over-Exploited
10	Jagraon	165	Yes	Yes	Over-Exploited
11	Sidhwan Bet	134	Yes	Yes	Over-Exploited

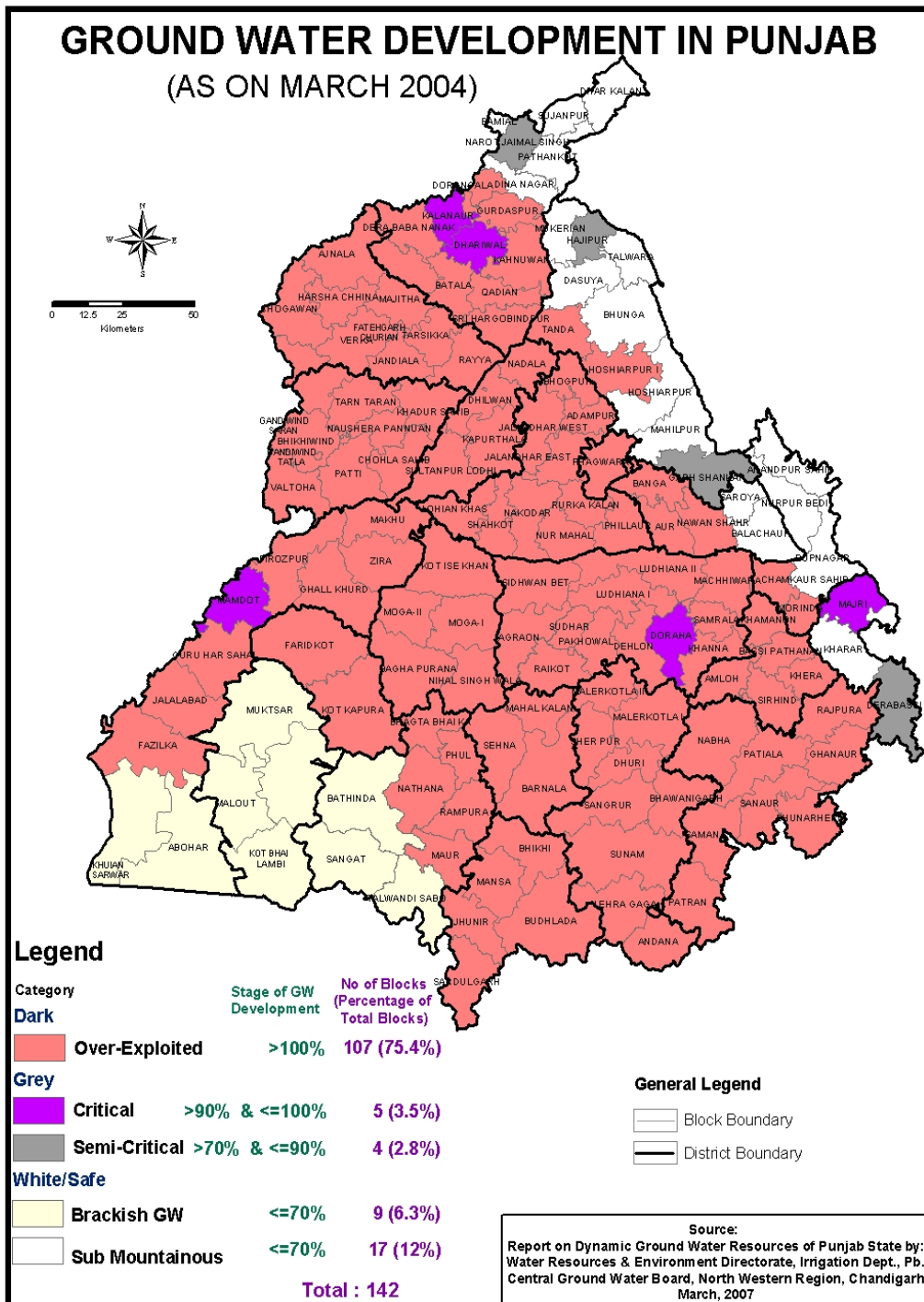
Various technical parameters like rainfall -recharge, return flows of irrigations and seepage from canals etc. are computed to arrive at the final figure of ground water balance for the blocks of all the districts. The blocks are categorised as Dark, Grey or White on the basis of stage of development. If the stage of development is above 100%, the block is categorised as Dark i.e. the block is over exploited and no further exploitation is possible, if it is between 90% and 100%, the block is Grey (Critical), and

if it is between 70% and 90%, the block is Grey (Semi-Critical), i.e. limited exploitation is possible, if it is below 70% the block is categorised as White i.e. unlimited exploitation is possible. Ground Water Development in Punjab as on March 2004 is given in Map No. 6 which shows Doraha block as Grey (Critical) and all other blocks as Over- Exploited category i.e. in Dark category.

GWC carries out the work of ground water quality monitoring by collecting the ground water samples from Tube-wells at average 30m depth and sent to the Chandigarh laboratory for analysis. Suitability of water for irrigation is determined by Electrical Conductivity (EC) and Residual Sodium Carbonate (RSC) of water along with the texture of soil to be irrigated. Water with less than 2.5 of RSC is categorised as fit for irrigation, 2.5 to 5 RSC as marginal fit and more than 5 RSC as unfit for irrigation. On the basis of Ground water quality, ground water quality maps are prepared. Ground Water Quality map of District Ludhiana is given as Map No. 7.

GROUND WATER DEVELOPMENT IN PUNJAB

(AS ON MARCH 2004)

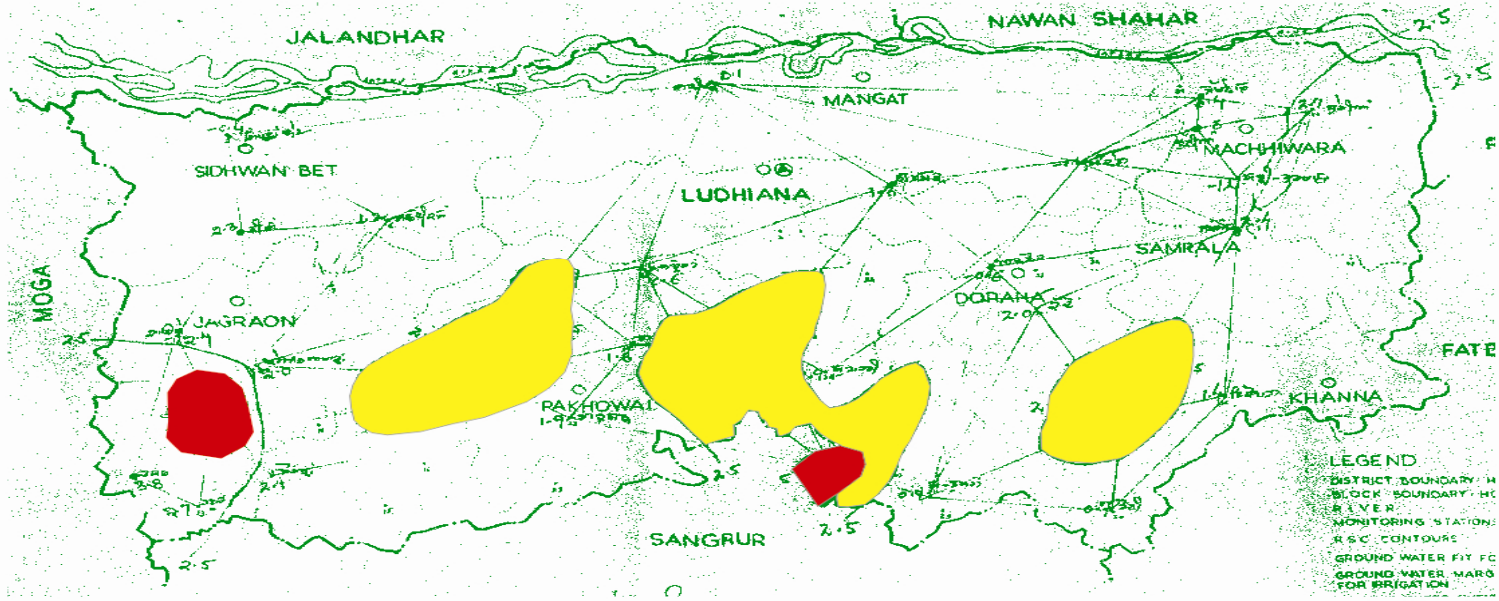


Source:
Report on Dynamic Ground Water Resources of Punjab State by:
Water Resources & Environment Directorate, Irrigation Dept., Pb.
Central Ground Water Board, North Western Region, Chandigarh
March, 2007

Map No.6 Ground Water Development in Punjab

GROUND WATER QUALITY MAP OF DISTRICT LUDHIANA

YEAR 2008 (AV. DEPTH 30M)



Unfit for Irrigation



Marginally fit for Irrigation



Fit for Irrigation

Map No.7 Ground Water Quality Map of District Ludhiana

STAFF STRENGTH

The Ground Water Cell, Ludhiana faces acute shortage of staff. To work efficiently, the sanctioned staff posts must be filled. The Ground Water Cell office is in the rented accommodation.

EQUIPMENT REQUIRED

The Ground Water Cell requires the following equipment for measuring water level and checking the chemical quality of Ground Water.

Sr No.	Item	Number	Approx. Cost Per Year
1	Water Level Indicator / Sounder	4	20,000
2	Ground Water Quality Testing Kit	4	40,000
3	Measuring Tapes	2	2,000
4	Office Stationary		8,000
5	Information Technology Unit	1	2,00,000
6	Mobile Water Testing Van	1	10,00,000
		TOTAL	12,70,000

1st Year 12,70,000 and 3,00,000 per year for next 4 years

TOTAL FOR FIVE YEARS: 24,70,000