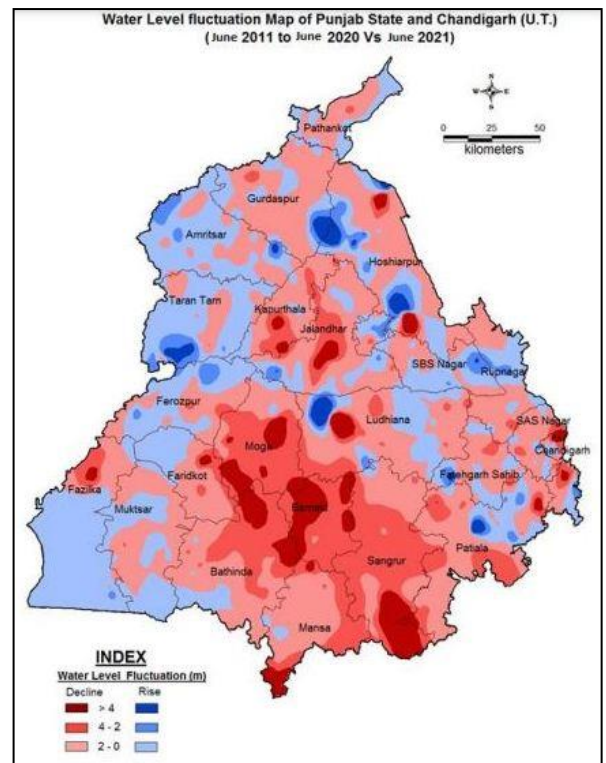


a) At which speed ground water is depleting in Punjab?

Decadal Mean Water Level Fluctuation: - Changes in water level behaviour since last one decade are determined using decadal mean data. Water level mean of past one decade for each ground water observation well is computed and compared with the respective water level data of the given monitoring to determine the decadal mean water level fluctuation.

Changes in water level behaviour since last one decade are determined using decadal mean data. Water level mean of past one decade (2011-2020) for each ground water observation well is computed and compared with the respective water level data of May 2021. The behaviour of water level over the period under reference is discussed in paragraph below along with Fig.5.13. The decadal mean fluctuations show that decline in 80% of observation wells monitored covering about 65% area of the state. The decline has been observed in all the districts of the state but predominantly in central and southern parts of the state. The decline of 0-2 m has been observed in about 41% of wells and 45% of area. Water level decline of 2-4 m is observed in 17% of the wells and 21% of the area. Water level decline of >4m is observed in 15% of the wells and 17% of area.



- b) How many blocks in Punjab have come under red alert as far as ground water depletion is concerned.

As per Ground Water Resource estimation report 2020, (119) blocks are under Over Exploited category.

District wise data and blocks are given below:-

CATEGORIZATION OF BLOCKS OF PUNJAB STATE (BLOCK WISE)			2020	
STATE	DISTRICT	BLOCK	Categorization of Assessment Unit	
	<b>Amritsar</b>			
PUNJAB	Amritsar	Ajnala	over_exploited	
PUNJAB	Amritsar	Attari	over_exploited	
PUNJAB	Amritsar	Chogawan	over_exploited	
PUNJAB	Amritsar	Harsha Chhina	over_exploited	
PUNJAB	Amritsar	Jandiala Guru	over_exploited	
PUNJAB	Amritsar	Majitha	over_exploited	
PUNJAB	Amritsar	Rayya	over_exploited	
PUNJAB	Amritsar	Tarsikka	over_exploited	
PUNJAB	Amritsar	Verka	over_exploited	
	<b>BARNALA</b>			
PUNJAB	Barnala	Barnala	over_exploited	
PUNJAB	Barnala	Mahal Kalan	over_exploited	
PUNJAB	Barnala	Sehna	over_exploited	
	<b>BATHINDA</b>			
PUNJAB	Bathinda	Bathinda	over_exploited	
PUNJAB	Bathinda	Bhagta Bhai Ka	over_exploited	
PUNJAB	Bathinda	Goniana Mandi	over_exploited	
PUNJAB	Bathinda	Maur	over_exploited	
PUNJAB	Bathinda	Nathana	over_exploited	
PUNJAB	Bathinda	Phul	over_exploited	
PUNJAB	Bathinda	Rampura	semi_critical	
PUNJAB	Bathinda	Sangat	safe	
PUNJAB	Bathinda	Talwandi Sabo	critical	
	<b>FARIDKOT</b>			
PUNJAB	Faridkot	Faridkot	over_exploited	
PUNJAB	Faridkot	Jaiton	over_exploited	
PUNJAB	Faridkot	Kot Kapura	over_exploited	
	<b>FATEHGARH SAHIB</b>			

PUNJAB	Fatehgarh Sahib	Amloh	over_exploited	
PUNJAB	Fatehgarh Sahib	Bassi Pathanan	over_exploited	
PUNJAB	Fatehgarh Sahib	Khamanon	over_exploited	
PUNJAB	Fatehgarh Sahib	Khera	over_exploited	
PUNJAB	Fatehgarh Sahib	Sirhind	over_exploited	
	<b>FAZILKA</b>			
PUNJAB	Fazilka	Abohar	safe	
PUNJAB	Fazilka	Arniwala Sheikh Subanpur	over_exploited	
PUNJAB	Fazilka	Fazilka	critical	
PUNJAB	Fazilka	Jalalabad	over_exploited	
PUNJAB	Fazilka	Khuian Sarwar	safe	
	<b>FEROZEPUR</b>			
PUNJAB	Firozpur	Firozpur	over_exploited	
PUNJAB	Firozpur	Ghall Khurd	over_exploited	
PUNJAB	Firozpur	Guruhar Sahai	over_exploited	
PUNJAB	Firozpur	Makhu	over_exploited	
PUNJAB	Firozpur	Mamdot	over_exploited	
PUNJAB	Firozpur	Zira	over_exploited	
	<b>GURDASPUR</b>			
PUNJAB	Gurdaspur	Batala	over_exploited	
PUNJAB	Gurdaspur	Dera Baba Nanak	over_exploited	
PUNJAB	Gurdaspur	Dhariwal	over_exploited	
PUNJAB	Gurdaspur	Dina Nagar	semi_critical	
PUNJAB	Gurdaspur	Dorangala	safe	
PUNJAB	Gurdaspur	Fatehgarh Churian	over_exploited	
PUNJAB	Gurdaspur	Gurdaspur	critical	
PUNJAB	Gurdaspur	Kahnuwan	over_exploited	
PUNJAB	Gurdaspur	Kalanaur	over_exploited	
PUNJAB	Gurdaspur	Qadian	critical	
PUNJAB	Gurdaspur	Sri Hargobindpur	critical	
	<b>HOSHIARPUR</b>			
PUNJAB	Hoshiarpur	Bhunga	safe	
PUNJAB	Hoshiarpur	Dasuya	over_exploited	
PUNJAB	Hoshiarpur	Garh Shankar	over_exploited	
PUNJAB	Hoshiarpur	Hajipur	safe	
PUNJAB	Hoshiarpur	Hoshiarpur-1	over_exploited	
PUNJAB	Hoshiarpur	Hoshiarpur-2	semi_critical	
PUNJAB	Hoshiarpur	Mahilpur	semi_critical	
PUNJAB	Hoshiarpur	Mukerian	semi_critical	
PUNJAB	Hoshiarpur	Talwara	safe	

PUNJAB	Hoshiarpur	Tanda	over_exploited	
	<b>JALANDHAR</b>			
PUNJAB	Jalandhar	Adampur	over_exploited	
PUNJAB	Jalandhar	Bhogpur	over_exploited	
PUNJAB	Jalandhar	Jalandhar East	over_exploited	
PUNJAB	Jalandhar	Jalandhar West	over_exploited	
PUNJAB	Jalandhar	Lohian	over_exploited	
PUNJAB	Jalandhar	Mehatpur	over_exploited	
PUNJAB	Jalandhar	Nakodar	over_exploited	
PUNJAB	Jalandhar	Nur Mahal	over_exploited	
PUNJAB	Jalandhar	Phillaur	over_exploited	
PUNJAB	Jalandhar	Rurka Kalan	over_exploited	
PUNJAB	Jalandhar	Shahkot	over_exploited	
	<b>KAPURTHALA</b>			
PUNJAB	Kapurthala	Dhilwan	over_exploited	
PUNJAB	Kapurthala	Kapurthala	over_exploited	
PUNJAB	Kapurthala	Nadala	over_exploited	
PUNJAB	Kapurthala	Phagwara	over_exploited	
PUNJAB	Kapurthala	Sultanpur Lodhi	over_exploited	
	<b>LUDHIANA</b>			
PUNJAB	Ludhiana	Dehlon	over_exploited	
PUNJAB	Ludhiana	Doraha	over_exploited	
PUNJAB	Ludhiana	Jagraon	over_exploited	
PUNJAB	Ludhiana	Khanna	over_exploited	
PUNJAB	Ludhiana	Ludhiana-1	over_exploited	
PUNJAB	Ludhiana	Ludhiana-2	over_exploited	
PUNJAB	Ludhiana	Machhiwara	over_exploited	
PUNJAB	Ludhiana	Maloud	over_exploited	
PUNJAB	Ludhiana	Pakhowal	over_exploited	
PUNJAB	Ludhiana	Raikot	over_exploited	
PUNJAB	Ludhiana	Samrala	over_exploited	
PUNJAB	Ludhiana	Sidhwan Bet	over_exploited	
PUNJAB	Ludhiana	Sudhar	over_exploited	
	<b>MALERKOTLA</b>			
PUNJAB	Malerkotla	Malerkotla-1	over_exploited	
PUNJAB	Malerkotla	Malerkotla-2	over_exploited	
	<b>MANSA</b>			
PUNJAB	Mansa	Bhikhi	over_exploited	
PUNJAB	Mansa	Budhlada	over_exploited	
PUNJAB	Mansa	Jhunir	over_exploited	
PUNJAB	Mansa	Mansa	over_exploited	
PUNJAB	Mansa	Sardulgarh	over_exploited	
	<b>MOGA</b>			
PUNJAB	Moga	Bagha Purana	over_exploited	
PUNJAB	Moga	Kot Ise Khan At	over_exploited	

		Dharamkot		
PUNJAB	Moga	Moga-1	over_exploited	
PUNJAB	Moga	Moga-2	over_exploited	
PUNJAB	Moga	Nihal Singh Wala	over_exploited	
	<b>MUKTSAR</b>			
PUNJAB	Muktsar	Kot Bhai At Gidderbaha	safe	
PUNJAB	Muktsar	Lambi	safe	
PUNJAB	Muktsar	Malout	safe	
PUNJAB	Muktsar	Muktsar	safe	
	<b>PATHANKOT</b>			
PUNJAB	Pathankot	Bamial	semi_critical	
PUNJAB	Pathankot	Dhar Kalan	safe	
PUNJAB	Pathankot	Gharota	semi_critical	
PUNJAB	Pathankot	Narot Jaimal Singh	semi_critical	
PUNJAB	Pathankot	Pathankot	safe	
PUNJAB	Pathankot	Sujanpur	safe	
	<b>PATIALA</b>			
PUNJAB	Patiala	Bhunarheri	over_exploited	
PUNJAB	Patiala	Ghanaur	over_exploited	
PUNJAB	Patiala	Nabha	over_exploited	
PUNJAB	Patiala	Patiala	over_exploited	
PUNJAB	Patiala	Patran	over_exploited	
PUNJAB	Patiala	Rajpura	over_exploited	
PUNJAB	Patiala	Samana	over_exploited	
PUNJAB	Patiala	Sanaur	over_exploited	
PUNJAB	Patiala	Shambu Kalan	over_exploited	
	<b>RUPNAGAR</b>			
PUNJAB	Rupnagar	Anandpur Sahib	semi_critical	
PUNJAB	Rupnagar	Chamkaur Sahib	over_exploited	
PUNJAB	Rupnagar	Morinda	over_exploited	
PUNJAB	Rupnagar	Nurpur Bedi	critical	
PUNJAB	Rupnagar	Rupnagar	safe	
	<b>SANGRUR</b>			
PUNJAB	Sangrur	Andana	over_exploited	
PUNJAB	Sangrur	Bhawanigarh	over_exploited	
PUNJAB	Sangrur	Dhuri	over_exploited	
PUNJAB	Sangrur	Dirba	over_exploited	
PUNJAB	Sangrur	Lehra Gaga	over_exploited	
PUNJAB	Sangrur	Sangrur	over_exploited	
PUNJAB	Sangrur	Sher Pur	over_exploited	
PUNJAB	Sangrur	Sunam	over_exploited	
	<b>SAS NAGAR</b>			
PUNJAB	SAS Nagar	Derabassi	over_exploited	
PUNJAB	SAS Nagar	Kharar	over_exploited	
PUNJAB	SAS Nagar	Majri	safe	

	<b>SBS NAGAR</b>			
PUNJAB	SBS Nagar	Aur	over_exploited	
PUNJAB	SBS Nagar	Balachaur	semi_critical	
PUNJAB	SBS Nagar	Banga	over_exploited	
PUNJAB	SBS Nagar	Nawan Shahr	over_exploited	
PUNJAB	SBS Nagar	Saroya	safe	
	<b>TARN TARAN</b>			
PUNJAB	Tarn Taran	Bhikhiwind	over_exploited	
PUNJAB	Tarn Taran	Chohla Sahib	over_exploited	
PUNJAB	Tarn Taran	Gandiwind Tatla	over_exploited	
PUNJAB	Tarn Taran	Khadur Sahib	over_exploited	
PUNJAB	Tarn Taran	Naushera Pannuan	over_exploited	
PUNJAB	Tarn Taran	Patti	over_exploited	
PUNJAB	Tarn Taran	Tarn Taran	over_exploited	
PUNJAB	Tarn Taran	Valtoha	over_exploited	

- c) What is the current extraction rate of ground water in Punjab?

As per Ground Water Resource estimation report 2020, stage of ground water development is 164%.

- d) What is average depth at which ground water is available in Punjab?

In order to assess the quantitative change in ground water resources, water levels were monitored as a routine of four times in a year. The behaviour of water level in June 2021, August 2021, October 2021 and January 2022 is discussed as below. The maximum and minimum water levels recorded in different season is given below in Table 5.1.

Table 5.1 the maximum and minimum water levels during all four seasons

Range	June 2021	August 2021	October 2021	January 2022
Minimum	0.28m bgl Sitoganno (Fazilka district)	1.34 m bgl Kiari DW (Pathankot District)	0.30 m bgl Mehmuana (Faridkot district)	1.13 m bgl Khanikhui (Pathankot district)
Maximum	68.00 m bgl Sanga Pz (Mansa District)	59.70 m bgl Bassi Ballo (Hoshiarpur District)	57.40 m bgl Bassi Ballo (Hoshiarpur District)	57.45 m bgl Bassi Ballo (Hoshiarpur District)

It is evident from the above table 5.1 that shallowest water level conditions prevail in Fazilka, Faridkot & Pathankot districts. While deepest water level conditions exist in the Mansa & Hoshiarpur districts.

#### Depth to Water Level in June 2021:-

The behavioural pattern of water level in June 2021 along with depth to water level map (Fig.5.1) is discussed below. The depth to water level lies between 0.28m bgl at Sitoganno in Fazilka district and 68 m bgl at Sanga Pz in Mansa district. Very shallow water levels of 0-2 m (causing water logging) occur in 2% of wells and cover nearly 1% area of the state in isolated patches in Faridkot, Muktsar, and Fazilka districts. Shallow water levels of 2-5 m have been observed in 12% of the wells and 10% of the total area that lies in south western parts of state i.e Muktsar, Fazilka, Faridkot, and in northern parts of Gurdaspur & Pathankot districts and few isolated patches in north eastern parts. These are mainly canal command areas and use canal water for their agricultural needs. The water levels between 5-10 m are observed in the northern and north eastern parts (parts of Pathankot, Gurdaspur, Amritsar, SBS Nagar and Hoshiarpur districts), south and south western parts (Fazilka, Ferozpur, Faridkot, Muktsar, Bathinda and Mansa districts), eastern parts of Ludhiana and Ropar district. About 17% of wells and 15% of the area fall in this range. Moderately Deep water levels (10-20 m) are predominant and observed in 26% wells covering about 30% area of the State in central and western parts. Deep water levels (20-40 m) are also observed covering parts of Amritsar, Taran taran, Jalandhar, Kapurthala, SBS Nagar (Nawashehar), Hoshiarpur, Bathinda, Mansa, Moga, Ludhiana, Fatehgarh Sahib, Patiala, Sangrur, Barnala and SAS Nagar districts and observed in 39% wells covering about 41% area of the State in central and south-eastern part. Very deep water levels (>40 m) are observed in 2% wells as patches in Sangrur, Barnala, Patiala, Mansa and SAS Nagar districts covering 4% wells and 3% area of the State.

