

## **SUB-SUB PROGRAM IV. SUSTAINABLE MANAGEMENT OF WATER RESOURCES**

### **Expt. 4.1 Assessment of Groundwater Resources and Safe Utilization in Different Geo-Hydrological Regions**

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#### **Introduction**

In Bangladesh, groundwater is the major source of irrigation. About 71% of the irrigated area uses groundwater and the rest 29% is supplied with surface water. This resource is extensively used as a reliable and dependable source of irrigation. At present, groundwater is being extracted in this country through 1.1 million shallow tubewells and 25 thousand deep tubewells for irrigation purpose and rice is by far the largest irrigation user, with over 82% of the total irrigated area. Since groundwater is the main source of irrigation, it is necessary to know the fluctuation range of groundwater for proper assessment of the available groundwater resources.

#### **Objective:**

- i) To determine the fluctuation of groundwater level over time

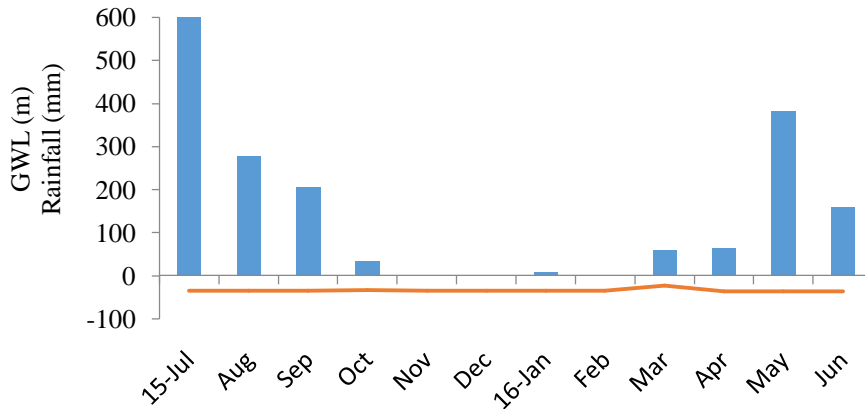
#### **Methodology**

The study was conducted at BRRI farm, Gazipur, Comilla, Hobiganj, Bhanga, Barisal, Kustia, Rajshahi and Rangpur. Available water level recorder was used for measuring groundwater fluctuation. Rainfall data were collected from Plant Physiology Division or nearest meteorological stations. Data were recorded weekly from BRRI farm Gazipur. Collected weekly records were calculated to obtain monthly average.

#### **Results and Discussion**

##### **Groundwater level in Gazipur**

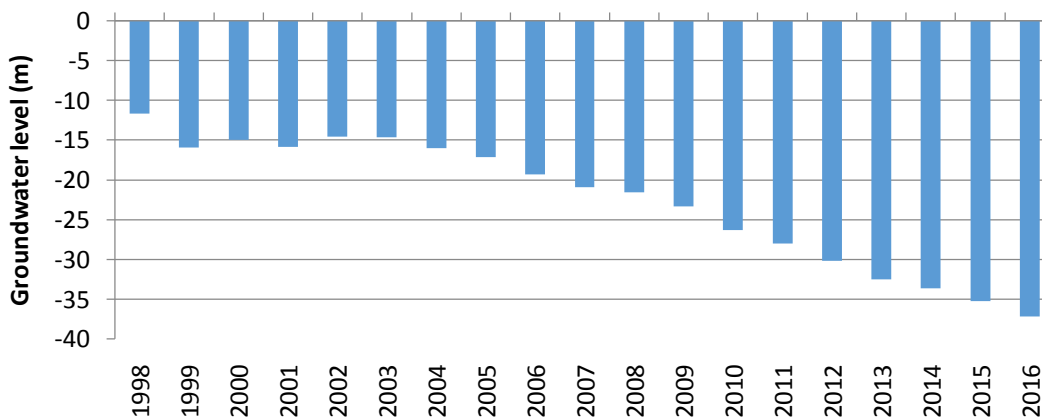
Monthly groundwater level fluctuations and rainfall at Gazipur during 2015-16 are shown in Fig. 12. During this period maximum lowering of groundwater (37.2 m) was observed in June and minimum (34.7 m) in August. The rainy season started from April but the lowering of groundwater observed upto June. The fluctuation was within 2.5 m. This minimum fluctuation indicated that recharge of groundwater was very low and it was not depends on rainwater. This low recharge is very alarming. This was happened due to increased pumping demand of many factories and industries surrounding BRRI Headquarter.



**Fig. 12. Fluctuation of groundwater level and rainfall at BRRi farm, Gazipur during 2015-16**

### Declination of groundwater in Gazipur

Figure 13 shows the declination of groundwater level during 1998-2016. The results showed that maximum groundwater level at BRRi farm Gazipur is declining day by day and it was not fully recharged after the monsoon. In 1998 the maximum groundwater level was about 11.68 m (Fig 16) from the ground surface which was 37.2 m in 2016. So the lowering was about 25.49 m in 19 years. During the initial five years the lowering rate was not so high and it was only 3 m (14.6-11.6 m). But during the last five years (2010- 2016) the lowering was about 9.2 m which is about 3 times of the initial declination rate. So the present high rate of declination is very alarming. The lowering is due to increased pumping demand due to establishment of many factories and industries surrounding BRRi H/Q.

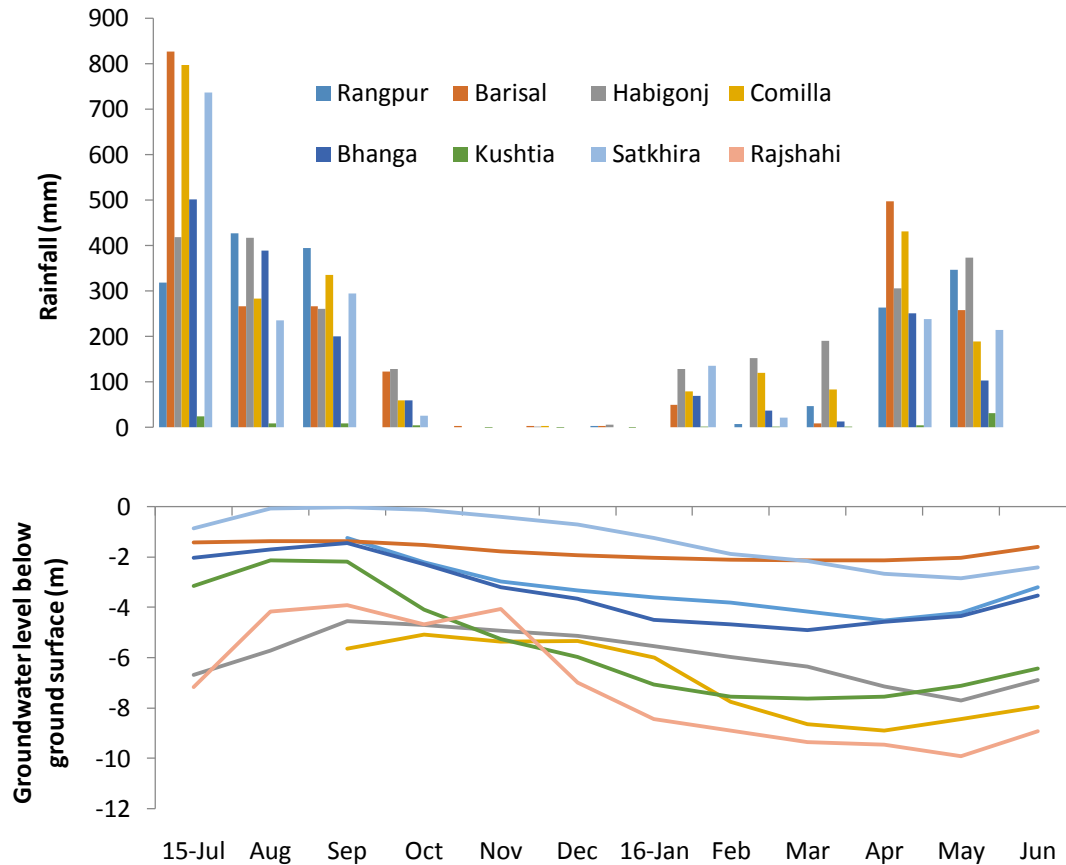


**Fig. 13. Declination of groundwater level at BRRi farm, Gazipur during 1998-2016**

### Groundwater level in BRRi regional stations

Among the BRRi regional station, groundwater level was lower from ground surface in Rajshahi (9.9 m) followed by Comilla (8.9 m) during dry season (Fig. 14). The closer groundwater level with ground surface was observed in Satkhira (0.07-2.8 m) and Barisal (1.4-2.1 m) during both of the season. GWL of 4.5, 2.1, 7.7, 8.9, 4.9, 7.6, 2.8 and 9.9 m was observed in Rangpur,

Barisal, Hobiganj, Comilla, Bhanga, Kushtia, Satkhira and Rajshahi, respectively during dry season. Similarly, GWL of 1.2, 1.4, 4.5, 5.6, 1.4, 2.1, 0.07 and 3.9 m was observed in Rangpur, Barisal, Hobiganj, Comilla, Bhanga, Kushtia, Satkhira and Rajshahi, respectively during wet season. The fluctuation of GWL was higher in Rajshahi (6 m) and lower in Barisal (0.75 m).



**Fig. 14. Groundwater level of different BRRi regional station during 2015-2016**

**Conclusion**

Maximum groundwater level at BRRi farm Gazipur is declining day by day and it was not fully recharged after the monsoon. Declination of groundwater in Gazipur is very alarming.

**Source: Irrigation and Water Management Division, BRRi**