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***Short communication***

# Incidence of drought at Sabour, Bihar

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The climatic water balance technique is an unique tool to assess the agroclimatic potential of any region according to Pandey, and Shekh(1999). The water balance of an area is an itemised statement of all gains, losses and changes of storage of water occurring in a given field within specified boundaries during a specified period of time. Knowledge of water balance is necessary to evaluate the possible methods to minimize loss and to maximize gain and utilization of water, which is so often the limiting factor in crop production.

Sabour (Lat. 25°14'N Long., 86°57'E and altitude 49 m above mean sea level) has sub-tropical climate where the mean rainfall is 1200 mm and 65 % of it is received during monsoon months of June to October.

Daily rainfall data were collected for a period of 31 years from 1972 to 2002 from the meteorological center, Bhagalpur Bihar. The weekly water balance computations were done for individual years following Thornthwaite and Mather (1955) to estimate the elements of water balance; viz actual evapotranspiration (AE) and Water surplus (WS) etc. The monthly potential evapotranspiration (Rao, *et.al.* 1971) were utilized in this study. Available water holding capacity for the soil for Sabour station was assumed as 200 mm.

The aridity index (Ia) the ratio of water dificult to potential evapotranspiration was calculated. Years of drought were identified and their intensities were assessed from the departure of the Ia from median value following Subrahmanyam (1982)

Results from the climatic water balance of Sabour in the Bihar state (Table1) show that the highest monthly rainfall is 258 mm occurring in July. The monthly water surplus is 134 mm in August and 128 mm in the month of September. Again it is revealed that potential evapotranspiration (PE) exceeds precipitation (P) for 8 months and the total annual water deficit comes to 501 mm.

For rest of the period, i.e. June to September the rainfall exceeds potential

**Table1:** Mean monthly climatic water balance at Sabour (1972-2002)

| Months | P | PE | Storage | AE | WD | WS |
|---|---|---|---|---|---|---|
| Jan | 19 | 56 | 77 | 35 | 21 | 0 |
| Feb | 17 | 79 | 57 | 37 | 42 | 0 |
| Mar | 9 | 142 | 31 | 35 | 107 | 0 |
| Apr | 22 | 186 | 18 | 36 | 150 | 0 |
| May | 59 | 200 | 11 | 65 | 135 | 0 |
| Jun | 175 | 143 | 43 | 143 | 0 | 0 |
| Jul | 258 | 115 | 186 | 115 | 0 | 0 |
| Aug | 256 | 108 | 200 | 108 | 0 | 134 |
| Sep | 234 | 106 | 200 | 106 | 0 | 128 |
| Oct | 80 | 112 | 170 | 110 | 2 | 0 |
| Nov | 6 | 75 | 121 | 56 | 20 | 0 |
| Dec | 1 | 53 | 93 | 29 | 24 | 0 |
| Annual | 1136 | 1375 | | 874 | 501 | 262 |

**Table 2.** Categorisation of drought years based upon Aridity index (Ia) based on data for 1972-2002

| **Categories** | Drought intensity | | | |
|---|---|---|---|---|
| | Moderate | Large | Severe | Disastrous |
| Less than ½ σ | 6 | | | |
| ½σ to σ | | 7 | | |
| σ To 2 σ | | | 2 | |
| Greater than 2 σ | | | | 1 |
| Total | 6 | 7 | 2 | 1 |
| Drought probability (%) | 19 | 22 | 6 | 3 |

evapotranspiration (PE) by 451 mm. Out of this amount 262 mm appears as water surplus and remaining 162 mm adds to soil moisture as recharge. Out of 12 months, only two, are water surplus months. On an annual basis the area has a water need of 1375 mm, where as rainfall is 1136 mm.

During the period under study, the

station experienced only 2 severe droughts in (1975 and 1995), 6 moderate, 7 large and 1 disastrous drought years (Table 2).

Large drought category is the most common with a probability of 22 percent while disastrous drought probability is 3 percent only.

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