

Monsoon Weather Fluctuations and its Impact on Agriculture in the Western Tract of West Bengal

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Abstract—The Western tract of West Bengal is designated as the drought prone area of the State. It is mainly due to so called low amount of rainfall and harsh climatic condition of the region. But if we consider the total amount of rainfall, it is not so much less compared to the Gangetic West Bengal.; sometimes it is higher than the Gangetic West Bengal. This region receives 1446.4 mm. rainfall on an average but 500-800 mm. rainfall moves as surface run off taking the advantage of undulating terrain of the area. Besides, rainfall of the area not only varies spatially but fluctuates also. In this study an attempt has been made to identify the trend and changing characteristics of monsoon in the western part of West Bengal and its impact on agriculture.

1. INTRODUCTION

The western part of west Bengal is generally identified as the most backward and under developed region of the state [3]. After 68 years of independence, adverse climatic condition, land form and soil condition pose great threats towards development.

According to the criteria followed by the India Meteorological Department, this region cannot be termed as drought prone. But the region is dry due to its undulating nature of terrain which creates speedy surface runoff. Average annual rainfall of this region is 1446.4 mm which varies from 1218.8 mm at Burra bazar in Purulia to 1704.0 mm at Pingla in Paschim Medinipur[4]. The adverse climatic condition of this region generally satisfies the following points:

1) so called very low rainfall 2) drought proneness 3) extremity of weather and climate 4) unfavourable climate for agriculture.

Monsoon is the main feature of weather and climate in the western part of West Bengal like the entire country. The study has been initiated to find out the trend of rainfall and reveal the impact of variable rainfall characteristics on agriculture of the area.

To mitigate the negative impact of changing character of monsoon, the cycle of weather and the normal weather requirement of crops can be synchronised during its life cycle.

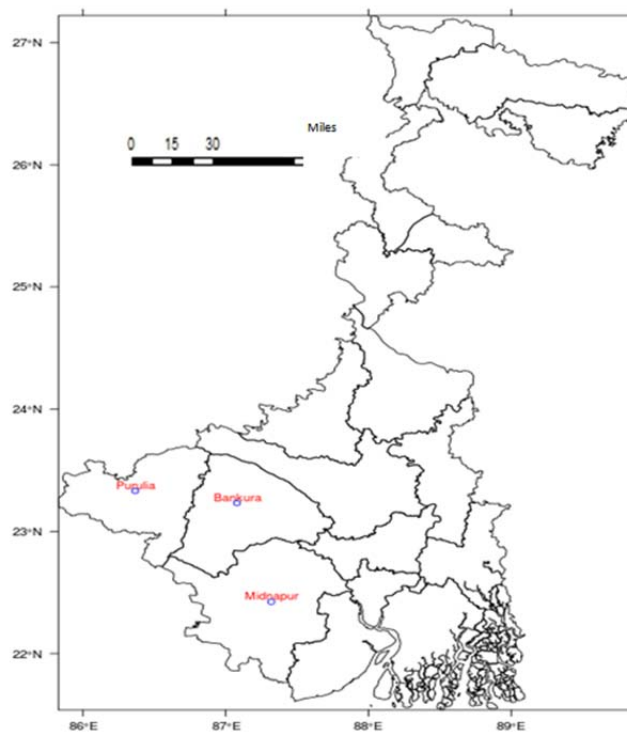


Fig. 1: Location Map

Study Area

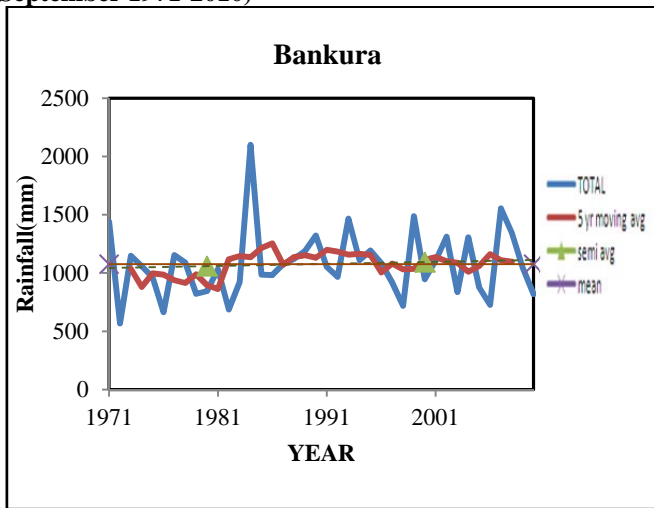
The western part of West Bengal, extending between 21°47'N-24°15'N and 85°49'E-88°2'E covers 32% of the total area of the State. It actually spreads over 99 CD blocks located in 13 sub-divisions of 5 districts viz- Purulia, Bankura, Birbhum, Asansol and Durgapur sub-division of Bardhaman and PaschimMedinipur excluding Ghatal sub-division (Mishra, S.,2012). But for the present study, three districts have been selected namely Purulia, Bankura and PaschimMedinipur.

Materials and Methods

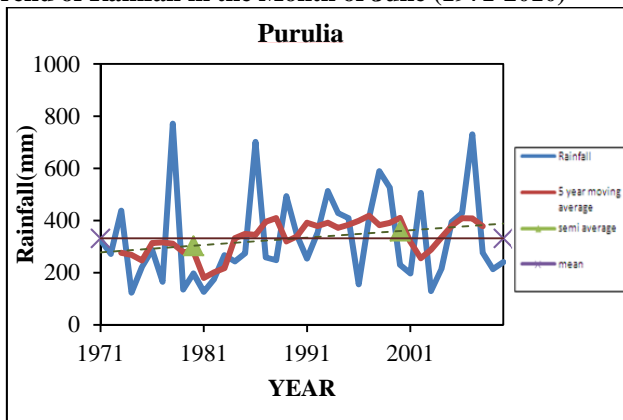
The study is based on both secondary as well as primary sources of data. Relevant data have collected through field survey and published literature. The preliminary knowledge about the study area has been collected from district gazetteers. Relevant data regarding the study area has been collected from published literatures in the form of books and journals. For the purpose of identifying the trend of monsoonal rainfall, 40 years (1971-2014) data of rainfall have been collected from Agricultural Meteorology Division of the State Agriculture Department, Government of West Bengal and India Meteorological Department, Alipur. To prepare water budget of the study area, the data of potential evapotranspiration has been collected from India Meteorological Department, Alipur. A number of statistical techniques have been employed to identify the recent trend of monsoon rainfall. Moving average and semiaverage methods have been applied to identify the trend of rainfall during June, July, August and September (monsoon months).

Analysis Part of the Study

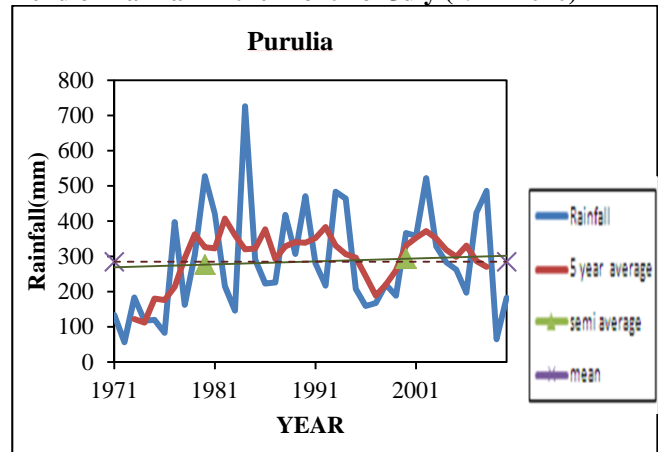
Trend of Rainfall From June To September 1971-2010



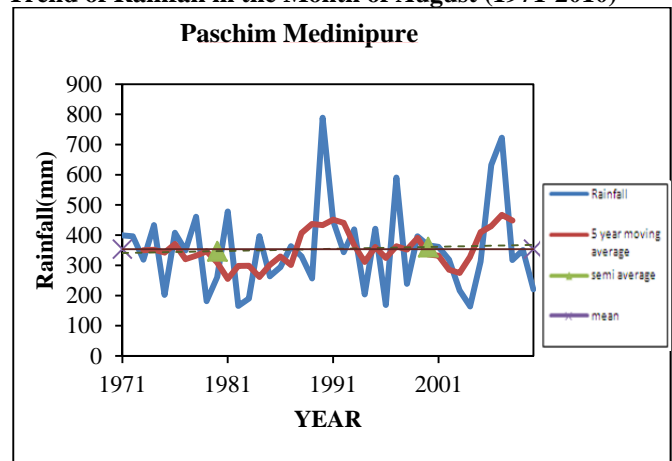
Trend of Rainfall in the Month of June (1971-2010)



Trend of Rainfall in the Month of July (1971-2010)



Trend of Rainfall in the Month of August (1971-2010)



Trend of Rainfall in the Month of September (1971-2010)

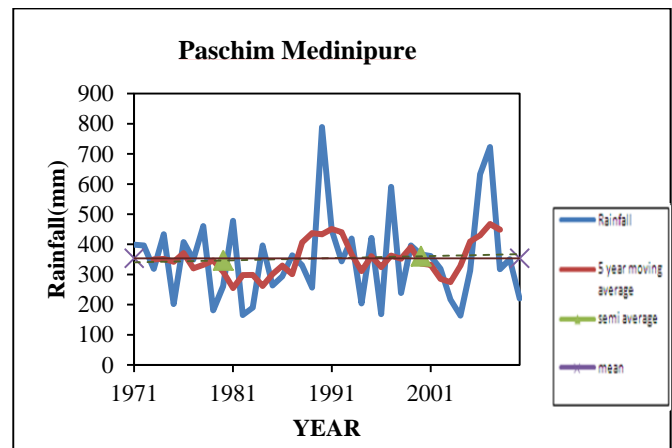


Table 1: District: Purulia

Observation	Total monsoon	1 st half of monsoon	2 nd half of monsoon	Mid monsoon	June	July	August	September
Rainfall (mm)	Marginal increase	Moderate increase	Moderate decrease	Marginal decrease	No significant change	Marginal increase	Moderate decline	Marginal increase
Rainy days	Marginal increase	Marginal increase	No appreciable change	Marginal increase	No significant change	Marginal increase	No significant change	No significant change

Table 2: District: Bankura Trend of Rainy Days (1971-2010)

Observation	Total monsoon	1 st half of monsoon	2 nd half of monsoon	Mid monsoon	June	July	August	September
Rainfall (mm)	Marginal increase	Moderate increase	Moderate decrease	Marginal decrease	No significant change	Marginal increase	Moderate decline	Marginal increase
Rainy days	Marginal increase	Marginal increase	No appreciable change	Marginal decrease	No significant change	Marginal increase	No significant change	No significant change

Table 3. District: PaschimMedinipur

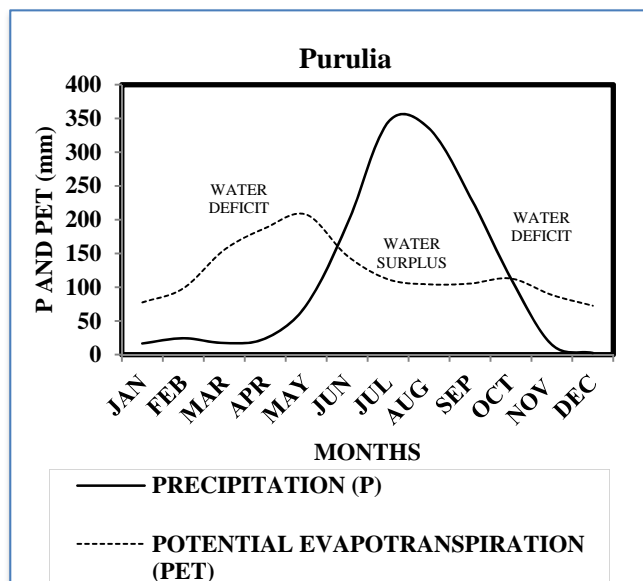
Observation	Total monsoon	1 st half of monsoon	2 nd half of monsoon	Mid monsoon	June	July	August	September
Rainfall (mm)	Marginal decrease	Moderate increase	Moderate decrease	Marginal decrease	Marginal increase	No significant change	Moderate decline	No significant change
Rainy days	No appreciable change	Marginal increase	No appreciable change	No appreciable change	No significant change	No significant change	No significant change	No significant change

Data Source: Agricultural Meteorology Division of the State Agriculture Department, Government of West Bengal

Water Budget

Like the other parts of the country as well as the state, the western tract of West Bengal comes under the grip of south west monsoon rainfall. This region receives 75 to 85% of the

normal rainfall during the south west monsoon season from June to September. This region receives 3%, 12% and 8-9% of the total rainfall during winter (December-February), summer (March-May) and post monsoon (October-November) respectively.



If we consider rainfall as water income and potential evapotranspiration as water loss, it is noticed that 500-800 mm of rainfall after satisfying the evaporation need goes mainly in the form of surface run off. If a major portion of this amount of surface run off is arrested, the problem of water scarcity will be solved to considerable extent.

Impact on Agriculture

The dry land zone or the western part of West Bengal is entirely dependent on monsoon rainfall for the agricultural activities like the entire state. The decline of rainfall during the mid monsoon period is very much harmful for the standing crops. In some cases abnormally low rainfall during June hampers the progress of seed bed preparation. If the rainfall during first half of monsoon is not sufficient then the farmer will go for dry seed bed preparation. Sufficient rainfall during mid monsoon period is congenial for the cultivation of kharif crops in the state. But all the aforesaid districts show the declining trend of rainfall during August which is basically a mid monsoon period. Low rainfall during August causes serious setback in the progress of transplantation of Aman paddy. Fortunately in the month of September there is no significant change of rainfall in the dry land zone of west Bengal.

2. CONCLUSION

In the dry land zone of West Bengal drought is a regular phenomena. But as per the criteria followed by India Meteorological Department, this zone cannot be designated as

the drought prone area. But the region is dry due to its undulating terrain, which results speedy runoff coupled with coarse grained soil with very little moisture holding capacity, making the top soil dry very soon. If a major portion of this amount of surface runoff is arrested, the problem of water scarcity will be solved to a considerable extent. A few more suggestions for water conservation and drought management in this region are as follows:

1. Plot to plot runoff control
2. Water conservation in plots
3. Creation of small reservoir.

BIBLIOGRAPHY

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