

## Evaluating the Spatio-temporal Drought Patterns over Bangladesh using Effective Drought Index (EDI)

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**Abstract**

Drought is a recurrent natural hazard in Bangladesh. It has significant impacts on agriculture, environment, and society. Well-timed information on the onset, extent, intensity, duration, and impacts of drought can mitigate the potential drought-related losses. Thus, drought characteristics need to be explained in terms of frequency, severity, and duration. This paper aims to characterize the spatial and temporal pattern of meteorological drought using EDI and illustrated drought severity over Bangladesh. Twenty-seven (27) station-based daily rainfall data for the study period of 1981–2015 were used to calculate the EDI values over Bangladesh. The evaluation of EDI is conducted for 4 sub-regions over the country to confirm the historical drought record-developed at the regional scale. The finding shows that on average, the frequency of severe to extreme drought is approximately 0.7 events per year. As a result of the regional analysis, most of the recorded historical drought events were successfully detected during the study period. Additionally, the seasonal analysis showed that the extreme droughts were frequently hit in northwestern, middle portion of the eastern and small portion of central parts of Bangladesh during the *Kharif*(wet) and *Rabi*(dry) seasons. The severe drought was affected recurrently in the central and northern regions of the country during all cropping seasons. The study also points out that the northern, south-western and central regions in Bangladesh are comparatively vulnerable to both extreme and severe drought event. The study showed that EDI would be a useful tool to identify the drought-prone area and time and potentially applicable to the climate change-induced drought evolution monitoring at regional to the national level in Bangladesh. The outcome of the present study can be used in taking anticipatory strategies to mitigate the drought damages on agricultural production as well as human sufferings in drought-prone areas of Bangladesh.

※This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government(NRF-2016R1C1B1010074)

**Keywords:** effective drought index, meteorological drought, Bangladesh

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