Linkage of Hydro-Climatological Variables to Flood and Drought in the Ganges Delta of Bangladesh

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1. Research background

- Anomalies of hydro-climatological factors (rainfall, temperature, ET, flow)

2. Methods

- Floods and Droughts
- Man Kendall trend, Sen’s slope test
- Pre-barrage (before 1976)
- Post-barrage (1976-2015)
- Water year (April-March)
- Data Period
- River water level (WL) crossing danger level (DL)
- Change in land elevation with respect to flooding depth
- Anomalies of hydro-climatological factors (Tidal)

3. Results

- Spatial variation of rainfall
- Change in flows with respect to pre-barrage period

4. Results

- Deviation of hydro-climatological parameters in the dry season from the mean of the pre-barrage period

5. Results

- Contribution of floods by major rivers
- Normal flooding year = average flow 1980-1986 (except for the 1994 flood year)

6. Conclusions

- Key factors for Floods:
  - Drainage congestion due to high sedimentation
  - Increasing can rainfall water => water logged condition
  - Comprehensive Drainage congestion due to high sedimentation

- Key factors affecting Droughts:
  - Reduced dry season flow
  - Statistically significant increasing trend for temperature and ET
  - Negligible amount of dry season rainfall (normal condition)

7. Future Plan

- To develop a comprehensive water management plan that can minimize floods, droughts and support future water availability in this freshwater deficit region.

[Image of water level station map and graphs showing changes in land types with respect to flooding depth, deviations in temperature and ET, and graphs showing number of years annual max WL > DL.]