Differing quantum and composition of marine fish catch in Mahanadi(Orissa) and Indian Bengal Delta(West Bengal), India in the perspective of Climate Change.

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The contiguous coastal states Orissa and West Bengal show marked differences in quantity and composition of marine fish catch during the period from 2007 to 2012; (Data adopted from Handbook of Fisheries Statistics, 2014, Ministry of Agriculture, Govt. of India). Interestingly, Wolf Herring (*Chirocentrous sp.*) and *Euthynnus affinis* are fished only at Orissa, while, Goat fish, Half Beaks, Indian Mackerel (*Rastrelliger kanagurta*), Yellowfin Tuna, *Caranx sp.* etc. are reported from West Bengal only. Several other fishes, which show consistent higher catch in either Orissa or West Bengal, are shown in the figures 2 & 3. The disposition of continental shelf & slope of these two coasts are also contrasting. The major fishing zone of West Bengal is limited to the wide (>200Km) shelf part while the Orissa fishers can easily venture to the slope and open sea crossing the narrow shelf region.

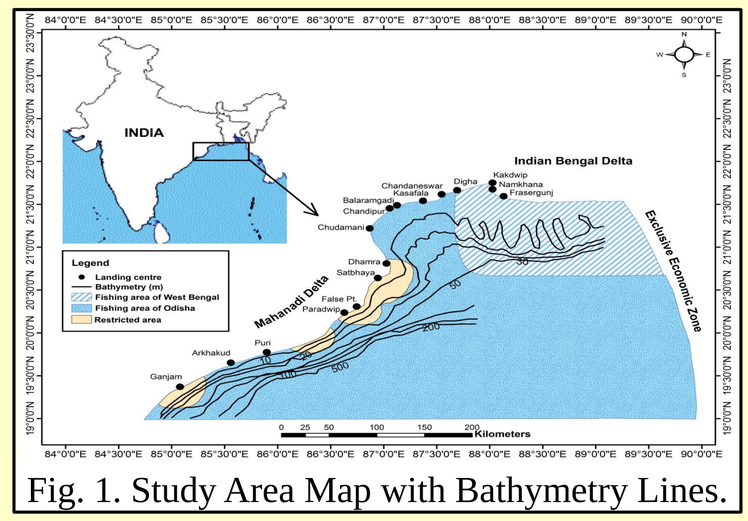


Fig. 1. Study Area Map with Bathymetry Lines.

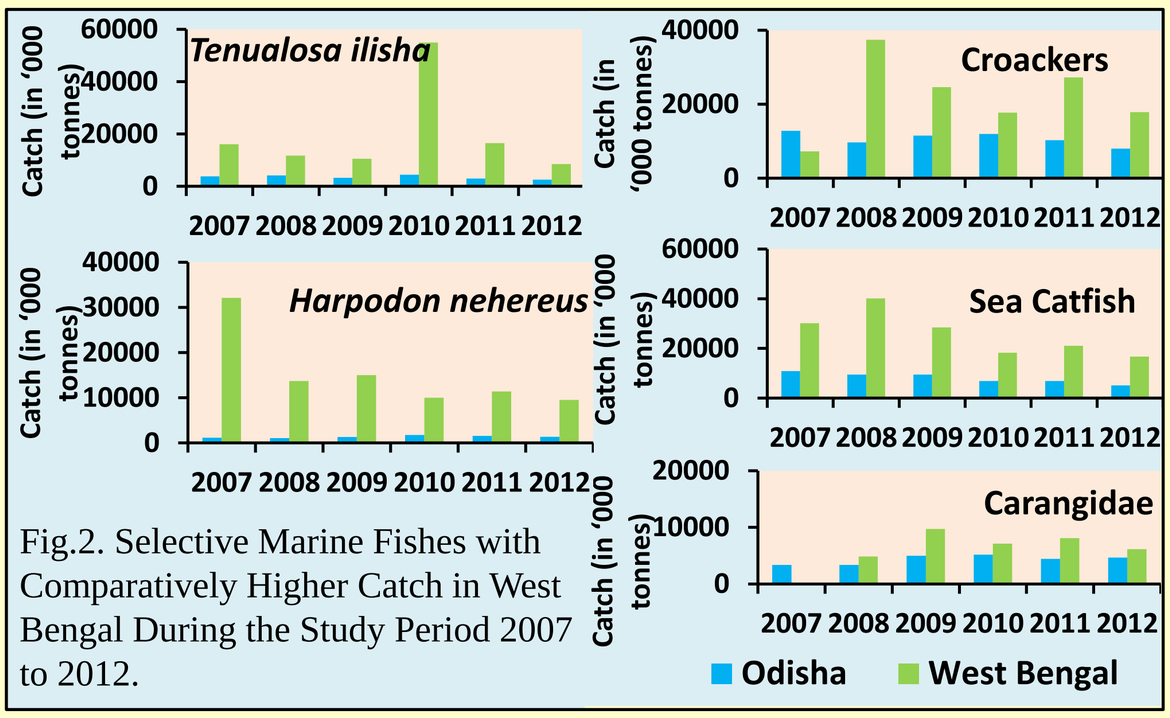


Fig.2. Selective Marine Fishes with Comparatively Higher Catch in West Bengal During the Study Period 2007 to 2012.

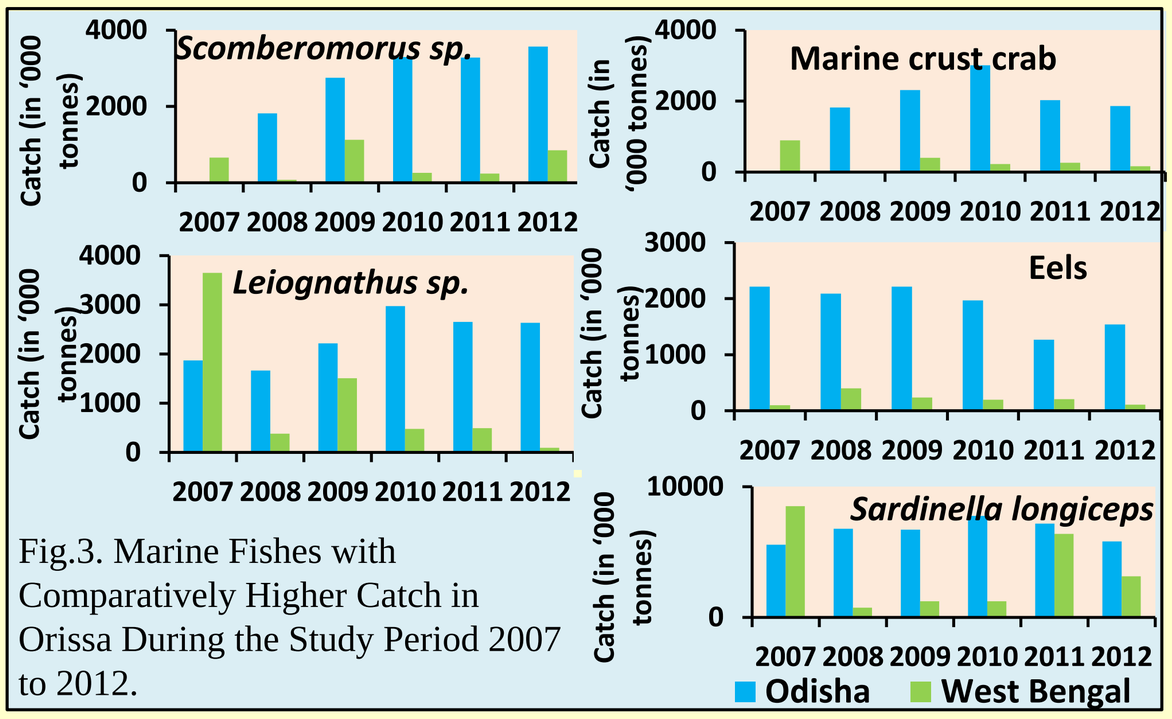


Fig.3. Marine Fishes with Comparatively Higher Catch in Orissa During the Study Period 2007 to 2012.

Fig. 4 showing the comparative annual marine fish catch of Orissa and West Bengal. over a decade.

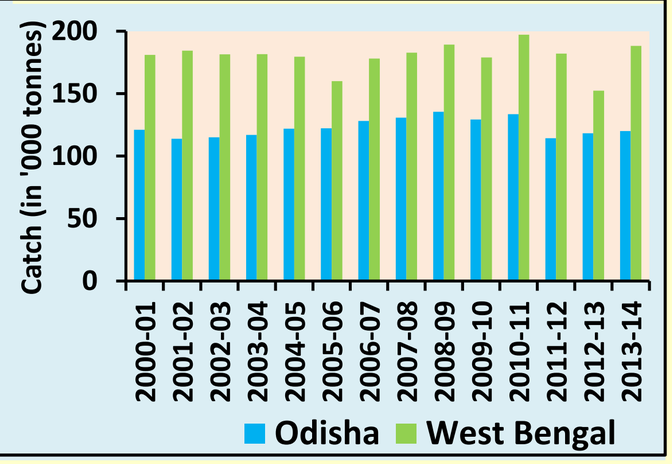
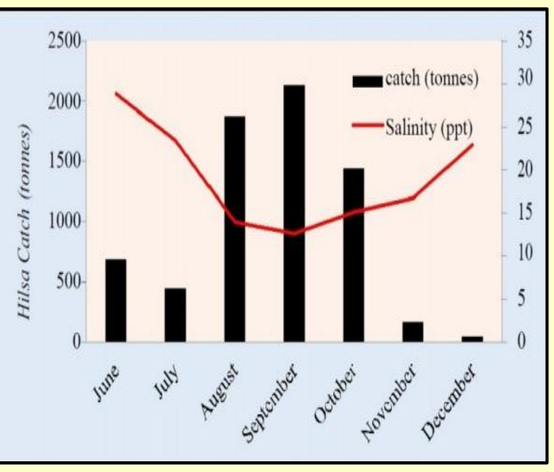


Fig. 5. Graph shows the Hilsa catch dependency over salinity or rainfall.



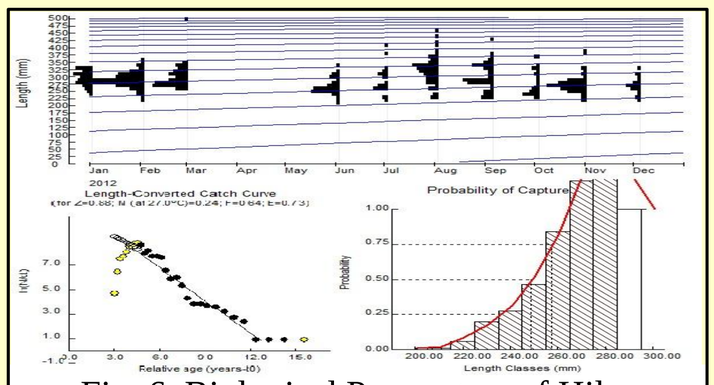


Fig. 6. Biological Parameters of Hilsa Calculated using FiSAT II software.

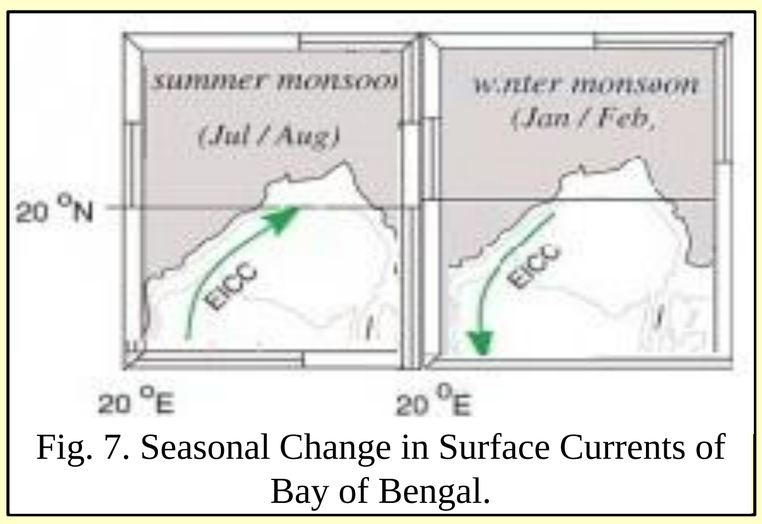


Fig. 7. Seasonal Change in Surface Currents of Bay of Bengal.

OBSERVATIONS:

- ✓ Fishing area of Orissa is larger than that of West Bengal but with lesser amount of annual fish catch (Fig. 4).
- ✓ The sea surface temperature (SST, according to the TRMM data) of West Bengal remains higher than Orissa during the Monsoon season & lower in the Pre-monsoon and Post-monsoon seasons.
- ✓ Surface salinity increases through North to South Orissa coast (Panda *et. al.*, 2012). The value ranges from 24.19 to 32.0 PSU. While, in the West Bengal coast salinity ranges from 18.7±0.9 to 25.8±0.7 (Das *et. al.* 2015) during winter, and 5.95 to 22.81, throughout the year (De e*t. al.* 2015).
- ✓ Availability of Hilsa (*Tenualosa ilisha*) shows remarkably strong inverse relation with salinity or rainfall (Fig. 5). It is also evident from the studies (Das, 2014) that the hazard events like cyclones are also have strong influence on fish catch.
- ✓ Surface currents change seasonally in the Bay of Bengal. The East India Coast Current (EICC), Southwest Monsoon Current (SMC), Northeast Monsoon Current (NMC) etc. show reversal of flow with seasons.

CONCLUSIONS:

The differences in rainfall, salinity and temperature, along with the ocean currents may be responsible for generating different physico-chemical environment in the coastal waters of the two deltas which in turn might play an important role in determining the movements and availability of the fishes. Further long term studies are required to explain the significant differences in fish catch and compositions of the two deltas. The role of climatic variables and extreme events like cyclones are therefore emphasised to design appropriate model with respect to Climate Change.

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