

## Planning Research on Climate Change and Zooplankton Density and Diversity in the Sagar Island, Indian Sundarbans Delta

SANGHAMITRA BASU<sup>1</sup>, CHITRA J<sup>2</sup>,  
SUBARNA BHATTACHARYYA<sup>3</sup> and A. K. GHOSH<sup>4</sup>

<sup>1</sup>Research scholar, Jadavpur University, Kolkata;

<sup>2</sup>Assistant Zoologist, Zoological Survey of India, Kolkata;

<sup>3</sup>Assistant Professor, School of Environmental Studies, Jadavpur University, Kolkata; and

<sup>4</sup>Director, Centre for Environment and Development, Kolkata.

### Introduction

Sundarbans, shared by India with Bangladesh, is located within one of the largest delta in the world, of 3 major rivers—Ganga, Meghna, Brahmaputra (GMB). Deltas are recognized as one of the most vulnerable areas in the era of climate change and a separate alliance of some of the largest delta dominated countries have been formed. The phenomenon of climate change is positive to affect coastal and marine ecosystem involving the food chain which sustains coastal and marine fisheries. Physico-chemical water of any delta water in the past along with their trend of fish landing may help to indicate possible adverse impacts.

A recent media report (The Times of India, December 19, 2016) quoted Central Marine Fishery Research Institute (CMFRI) report that more fish species on the east coast, especially in the coast of Odisha and West Bengal, are highly vulnerable to climate change: however it attributed the "vulnerability" factor not only to climate change but also to increasing fishing pressure and lower productivity, a total 47 of 68 species or 60% of the fish species studied were found to be vulnerable to climate change; these include the bombay duck, sharks, pomfrets, catfish, besides crustacean—shrimps. With sea surface temperature rising, most affected fish species are considered the ones that live in surface or near surface water called pelagic species, and they comprise of 50% of fish landing, according to CFMRI Report.

Bay of Bengal has also been under 'Large Marine Ecosystem' study (Vivekanandan et al., 2012). Analysis of long term changes in sea water temperature, acidity, deoxygenation, cyclones and sea-level rise etc in Bay of Bengal will help to understand large scale impacts on biological process and ocean productivity. The study revealed that 'traditional fishers would be most vulnerable to climate change'.

The present research is aimed at comparing the past data of 1980s with that of 2016-2018. To access any possible changes in physico-chemical parameters of coastal waters, seasonal data on salinity, pH, temperature, etc. of 1980s with

that of the 2016-2018 during the same season would be compared.

Likewise density of zooplankton per unit area would also be compared to understand changes. Work is also in progress to found out any changes in diversity or major species of zooplankton.

### Methodology

Field survey of selected stations in Sagar Island, Indian Sundarbans, is being carried out monthly from month of September 2016 to March 2017 and work would be continued till 2018. Water samples were collected (500ml) in all six stations viz, Sagar, Kachuberia, Sikarpur Khal, Hatipeta, Chemaguri, Phuldubi (Fig. 1). Some parameters were re-

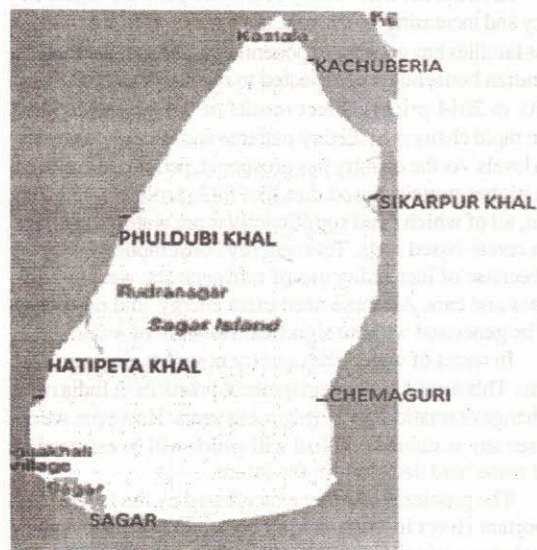


Fig. 1. The Map showing 6 stations where the study is being conducted.

corded in-situ such as temperature, pH, salinity while for the others water samples are brought to the laboratory of the School of Environmental Studies, Jadavpur University, for further analysis.

For determination of zooplankton density, Sedgewick Rafter counter and for zooplankton diversity ICES zooplankton manual would be followed.

**Acknowledgements:** The authors are grateful to Dr. Joydeep Mukherjee, Former Director and Dr. Tarit Roy Choudhury, Director of School of Environmental Studies, Jadavpur University, for laboratory facilities and Dr. Kailash Chandra, Director, Zoological Survey of India, for providing facilities for taxonomic work, during the tenure of the research.

#### References

- Times of India, 2016. 47 of 68 fish species in India under threat: Study. *Times of India, Kolkata, December 19, 2016.*
- University of Calcutta, 1987. *A long term multidisciplinary Research Approach and Report on Mangrove Ecosystem of Sundarbans.* Department of Marine Sciences, University of Calcutta : 92 pp. + 25 figs.
- Vivekanandan, E., Hermes, R., & O'Brien, C., 2012. Climate change effects in the Bay of Bengal large Marine ecosystem. In: *Frontline Observation on climate change and sustainability of Large Marine Ecosystem.* United Nations Development Programmes (UNDP), New York : 97-111.

(b.f. from page 79)

pay a visit to his old friend Claud Russell, then Chief of the Company's Factory at Vizagapatnam, and with whom his brother Dr. Patrick Russell was then living, and in 1784 he fulfilled this promise and stayed for a short time at Vizagapatnam on his way to Calcutta. During this halt he examined and arranged a collection of plants made by Dr. Russell, who again impressed upon him the necessity of arranging his manuscripts, which he promised to do. But the eagerness with which he sought novelties during the journey and the claims of his work in Calcutta prevented this being done and, on his return to Vizagapatnam in April 1785, he had not carried his good resolutions into effect "though the declining state of his health at that time rendered it more than ever expedient to prepare for an event which he himself appeared to consider at no great distance".

For two or three weeks he stayed with the Russells at Vizagapatnam and during this period he seemed to recover his health to great extent, and in May proceeded to Jagannathpur where he proposed to make an immediate commencement of the task of putting his manuscripts in order. But towards the end of the month he suffered a relapse of his former complaint (dysentery) under which he gradually sank until he expired on 26th of June 1785 in spite of the skill and friendly attentions of Dr. Roxburgh, who was then living close by at Samalkota.

On 6th June he had made his will by which he bequeathed all his papers to Sir Joseph Banks and few days before his death he had seen all such papers as were then with him sealed up in the presence of Dr. Roxburgh, by whom they were afterwards despatched safely to Sir Joseph Banks;

but others of his manuscripts, particularly those left at Tranquebar (including the Journal of his visits to Ceylon), were unfortunately not recovered, although Dr. Russell and Dr. Roxburgh did all in their power to obtain possession of them.

For many years Koenig had maintained a correspondence with Linnaeus and other European Botanists eminent at the time, and several of his communications to them regarding Indian Botany were published in the Transactions of the Societies of Copenhagen and Berlin, or included in the words of Retzius and other authors.

Although it is certain that he forwarded to Europe most, if not all, of the numerous insects described by Fabricius from Southern India, we know nothing of his direct interest in entomology beyond the present paper on Termites. Considering that absolutely nothing was known of the economy and habits of these insects before that time, his observations seem remarkably accurate and serve to show that Koenig set an extremely high standard for his time as the first entomological observer who accomplished any scientific work in India. His paper seems well worthy of being rescued from the obscurity in which it has remained for over one hundred and forty years."

[The above is taken from T. B. Fletcher's (1921) "Koenig's paper on South Indian Termites" published in the Report of the Proceedings of the Fourth Entomological Meeting, Pusa, 7-12 February 1921, pp. 312-333, pls LII-LV (especially pp. 313-318).

[Reproduced gratefully from the *Indian J. Biodiversity*, Bangalore, 1(1-2):185-188.]