

SRI LANKA

Issues Associated With Flooding of Malala Lagoon in Hambantota, Sri Lanka and Possible Solutions

M.F.K.F.F. Banu¹, N.W.B. Balasooriya^{2*}, V. Madha Suresh³

¹*Postgraduate Institute of Science, University of Peradeniya, Peradeniya, Sri Lanka*

²*Department of Geology, University of Peradeniya, Peradeniya, Sri Lanka*

³*Center for Natural Hazards & Disaster Management Studies, University of Madras, Chepauk, Chennai 60025, India.*

***E-mail:** *n123.balasooriya@gmail.com*

Malala lagoon is in Hambantota secretariat division of the Hambantota district, is situated in southern province which is affected from small and medium scale natural hazards in the recent past, includes last event of tsunami, human-elephant conflict, drought and floods. Some of natural disasters, like drought and flood occur regularly. Therefore, Hambantota is also indicated as a multi-hazard zone in Sri Lanka. Malala lagoon opens to the sea through a nearly 300 m wide mouth during the rainy season (Abeywickrama 2009). In the dry periods, the mouth is closed by a naturally formed sand bar which is about two meters high from the lagoon water level. Malala-Embilikala lagoon system comprises of two water bodies, Malala and Embilikala which are connected to each other through a narrow canal. Increased inflow into the lagoon system has created expansion of the lagoon surface area and thereby, it has created increased inundation in the surrounding area and water quality changes in the lagoon system (The World Bank, 2010, Ziegler, et al. 2012). The other problem created by the increased inflow is the water quality changes affecting, the salinity levels in the lagoon system thus creating ecological, biological, social, and economical problems in the lagoon system and it creates sedimentation in the lagoon.

The objectives of the study are to carry out a scientific study to assess the hydrological, ecological, and biological impacts of the increased inflow into the lagoon.

The data and information on land affected by the flood, inundation, economic problems, affected on farmers and fishermen livelihood, affected on

ecosystem and solutions etc. were collected by using a questionnaire from the villagers and by interviewing the Grama Niladari of Koholankala and the other relevant officials. Data about the living species inside the lagoon were collected in two different methods. First had a field study around the area with the help of a field officer of Bundala National Park and interview of the fishermen around the area then, the past data were collected by existing case studies. The secondary data were collected by interviewing the Grama Niladari divisions, Assistant Director of Hambantota Disaster Management Coordinating Unit, Director of statistical branch, field officer of Bundala National Park, Engineer of District Irrigation Engineering Department and Assistant Director of Urban Development Authority. The data were analyzed, and the results were obtained accordingly.

Recent modifications of the irrigation system and the associated alterations in the hydrology of the study area have created a marked impact on environment, affecting bot flora and fauna. The irrigation return water from both KOISP (Kirindi Oya Irrigation and Settlement Projec) and Bandagiriya irrigation schemes reach the studied lagoon system are agricultural based pollutants. Nutrient pollution in the lagoon is evident from high productivity and eutrophication. Since the KOISP was implemented, the salinity of the lagoons has dropped due to the inflow of upstream irrigation water. This change in salinity levels has influenced the population of birds as it has affected their food supply. Salinity changes in the lagoon affect the vegetation of the surrounding area and the lagoon fish and shrimp density.

There are positive impacts such as creation of new habitats, expansion of wetlands to land-water interface, supporting diverse biological communities due to expansion of habitats. However, it is apparent that drastic ecosystem changes are also taking place due to changes in water levels. Many large trees have died in the past years in inundated areas. Loss of large vegetation canopies will affect nesting habitats of larger bird species and there is a danger of diminishing populations of large migrant birds from this wetland site. Raising of water levels in the lagoons could make feeding sites unavailable for many water birds. Increased fresh water inputs to the lagoons may convert these brackish coastal ecosystems into fresh water ones causing a profound impact on the associated biota. This disaster situation as created shrinking of available paddy lands causing limitations in agricultural activities. This has

affected lively hoods of large numbered families. In addition, 75% of the fishing families in the area have been affected due to this disaster situation.

Five possible solutions can be incorporating also the opinions of the officials, farmers and fishing community. 1). Construction of a concrete spillway where the sand bar is formed, allowing the water to spill over to the sea when the water level rises; 2). Construction of an anicut across the channel connecting the Embilikala and Malala lagoon to control excess flows. This will protect fish stocks at Embilikala lagoon and at the same time would not create high water level at Malala that flood paddy field; 3). Diversion of water from Embilikala lagoon to sea through a canal constructed towards Bundala Lewaya; 4). Rehabilitation and modification of the existing canal Pita Ela located at south west end of the lagoon, allowing continuous flushing out of excess water and 5). To divert the excess inflows from the KOISP and Bandagiriya projects to any other area.