

**TRIBAL COMMUNITIES OF SUNDARBAN BIOSPHERE  
RESERVE (SBR) AND CLIMATE CHANGE**

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## SYNOPSIS

The Sundarbans Biosphere Reserve (SBR) is home to tribal communities that are not indigenous to the area. Early in the 19th century, they moved from the arid, rocky western region of the neighbouring Chotanagpur Plateau, which encompasses portions of Odisha and Jharkhand, or from neighbouring districts like Bankura, Birbhum, and Puruliya in West Bengal. This movement took place. When the colonial government, led by the East India Company, began land reclamation by mangrove deforestation in the western part of the Ganga-Brahmaputra Meghna (GBM) Delta. Socioeconomic deprivation affects the Scheduled Tribe (ST) communities that live in the Ganga Delta's Sundarban Biosphere Reserve in India.

Due to a variety of environmental and climatic hazards, such as sea level rise, more frequent and strong cyclones, salinization, erosion, and the retreat of mangrove forest cover, which exposes the coast to more extreme weather events, the tribal communities are the most socioeconomically vulnerable in the region. It has been difficult to evaluate the socioeconomic circumstances, migration patterns, and adaptation requirements of these communities due to a lack of caste-disaggregated reliable data and a number of gaps in policies and execution. The current work attempts to fill this gap by analyzing existing secondary data and literature, as well as conducting a primary survey of 600 tribal households and multi-hazard mapping at the village level. This research aims to provide, for the first time, an understanding of tribal mobility in the Indian Sundarbans in response to multiple climatic hazards in relation to their socioeconomic deprivation. It also identifies how the tribal people are coping or adapting to the impacts of climate change. It deals with the change in condition of tribal people in the Sundarbans since independence; furthermore, to what extent have policy interventions been successful in alleviating poverty and improving their overall living conditions is also investigated.

The objectives of the study are listed as: To identify and understand

- The spatial distribution of the tribal population across the 19 Community Development Blocks (CDBs) in the Sundarbans Biosphere Reserve (SBR) study area, along with the decadal changes in their population from 2001 to 2011, is analyzed.
- The socio-economic status of the tribal population is compared with that of the non-tribal population in the SBR, considering factors such as agricultural landholding, employment type, and education levels.

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- The social vulnerability (index) at the village level within the SBR using Census data from 2011.
- The Multidimensional Poverty Index (MPI) for the study area at the village level using both Census data (2011) and primary data (2021).
- The household-level deprivation (HDS) among the tribal population based on primary data.

The current socio-economic conditions of the tribal population, including aspects such as landholding, livelihood patterns, ecosystem dependency, food security, access to safe water, and education, were examined through a detailed primary survey.

Additionally, changes in livelihood strategies among Scheduled Tribe (ST) households in response to climate change are explored, along with an evaluation of policy interventions aimed at addressing these challenges.

Secondary data on demography and socio-economic conditions in the study area were obtained from the Indian Census surveys of 2001 and 2011 (Census data 2001, 2011, Ministry of Home Affairs, Government of India), along with the Primary Census Abstract, Socio-Cultural Table, and Housing Data from the Census of India (2011). To develop the multi-hazard index at the village level, satellite imagery was sourced from online platforms. Primary survey data were collected from households (both tribal and non-tribal) across the 19 Community Development Blocks (CDBs) of the Sundarbans Biosphere Reserve (SBR) during 2020-2021. The household data for this study were gathered using a structured questionnaire. In total, 1,800 households were surveyed, out of which data from 600 tribal households were utilized for this research. The selection of villages and households followed a two-stage stratified sampling approach. Several indices, including the Multi-Hazard Index and the Multidimensional Poverty Index (MPI), were developed at the village level. To assess the level of hazard risk in the surveyed villages, a multi-hazard map of the study area was created using three key hazard layers: inundation (caused by storm surges and floods), cyclones (including storms and high-velocity winds), and erosion. Focus group discussions and stakeholder interviews revealed a link between environmental impacts and prevailing socio-economic conditions as key drivers influencing migration decisions at the household level in the SBR. Potential drivers of migration were identified through expert discussions, and the final migration determinants were analyzed using Binary Logistic Regression (BLR). This

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method effectively examines the relationships between various independent variables (potential drivers of migration) and household migration decisions.

The percentage of the tribal population in the study area indicates greater spatial heterogeneity throughout the 19 community development blocks. Distress-driven, permanent migration of tribal people in the Sundarbans appears to be the cause of the observed depopulation trend from sea-facing or hazard-prone locations to areas perceived as safer. Over time, landlessness has become a significant hardship for the tribal people in the delta. Less than 0.5 hectares of land are owned by a sizable section of the indigenous community. In contrast to the reported and generally accepted agrarian livelihood pattern of the non-tribal populations, the primary livelihood pattern of tribal households in the SBR is primarily non-agrarian.

While disparities between the decadal growth rate of the ST population in the region might indicate their permanent displacement and internal migration, the research draws a few robust observations from the primary survey of the ST households under high and low deprivation categories to understand their seasonal migration behaviour from villages impacted by high, medium, and low levels of climatic hazards.

Binary logistic regression analysis was used to evaluate the likelihood of migration by taking into account household-level deprivation, household size, agricultural landholding, hazard occurrences, and access to mangrove ecosystem services. Owing agricultural land, Household level deprivation score, the village's hazard category, access to mangrove ecosystem services, and household size were found to have a significant ( $p < 0.05$ ) role in migration. The Binary Logistic Regression analysis's findings showed that there were important variables affecting the SBR's tribal populations' migration choices. Significant push reasons for migration from the SBR include marginal or non-existent agricultural landholding, dwindling access to the mangrove forest habitat, larger families, and greater household level impoverishment.

Tribal communities in the SBR reside outside Scheduled Areas, limiting their access to Non-Timber Forest Products (NTFPs). Poverty, landlessness, and insufficient income from livelihoods push many to illegally enter the protected mangrove forests (governed by the Indian Forest Act of 1927 and 1978), putting their lives at risk due to man-animal conflicts. Dispersed nature of tribal settlements (<50% of the population) and absence of land records in their favour before the cut-off year of 1978 act as a major deterrent and obstacle for them to access various Govt Schemes offered to the tribal communities in other scheduled areas or areas with tribal majority population

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The socioeconomic circumstances of tribal populations in the SBR are not improving due to substantial shortcomings in policymaking and policy implementation, which are made worse by the frequency and severity of hazards. Poverty and migration are made worse by the loss of traditional means of subsistence and cultural customs, as well as by limited access to forest resources and insufficient legislative support. In order to support the sustainable development of the tribal groups in climate-impacted areas like the Sundarban Biosphere Reserve, the thesis aims to create new opportunities for future research into appropriate paths for in-situ adaptation, safe migratory patterns, and progressive policy changes.

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