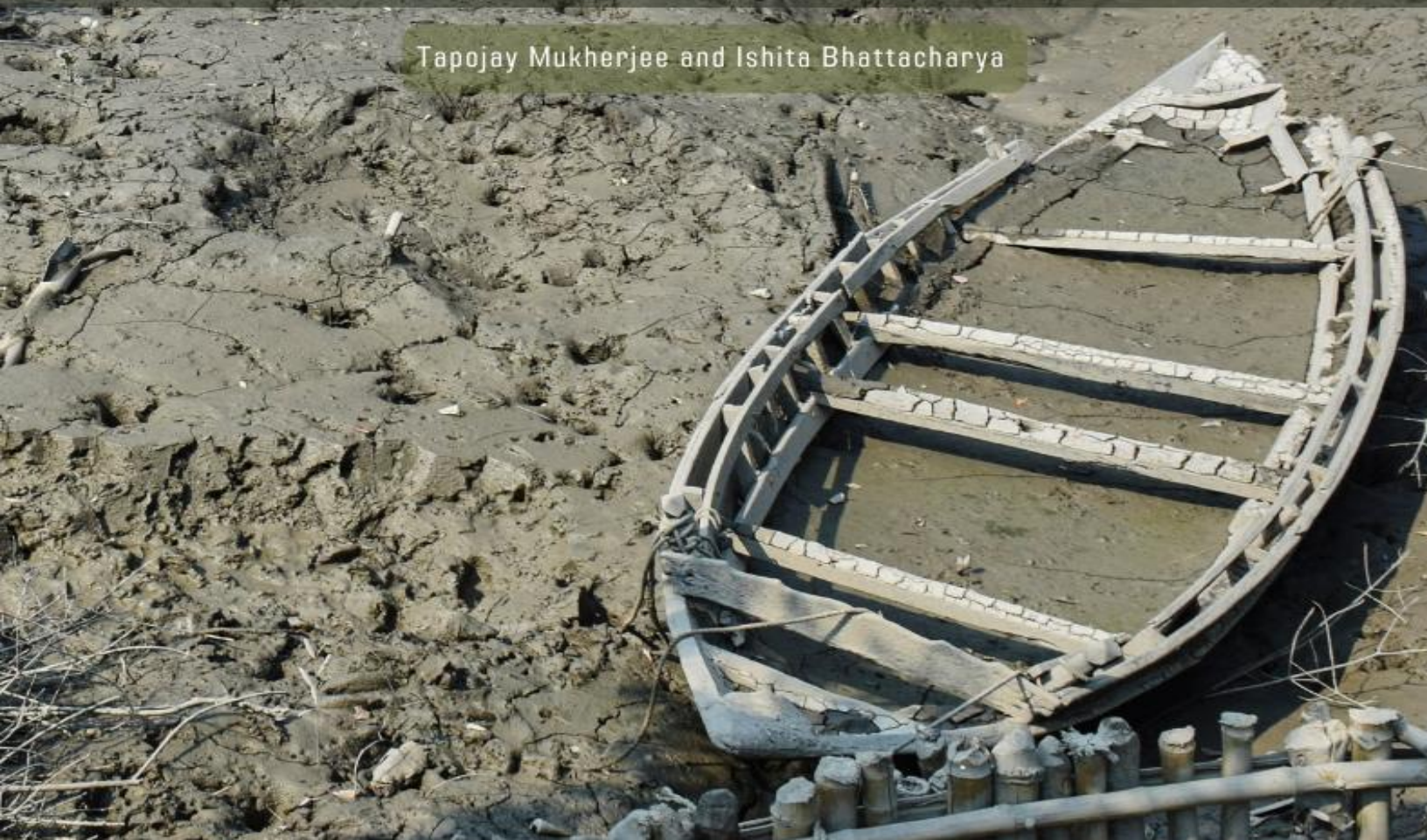
CFA
Centre for Financial Accountability

The Uncertain Future of Sundarbans

A Study on the change in livelihood options in Indian part of the Sundarbans Delta

Tapojay Mukherjee and Ishita Bhattacharya



The Uncertain Future of Sundarbans

A Study on the change in livelihood options in Indian part of the Sundarbans Delta

Tapojay Mukherjee and Ishita Bhattacharya

June 2022

CFA
Centre for Financial Accountability

Author: Tapojay Mukherjee and Ishita Bhattacharya

Cover and Design: Haripriya Harshan

Published by: Centre for Financial Accountability
R-21, South Extension II, New Delhi - 110049
www.cenfa.org | info@cenfa.org | +91-11-49123696

June 2022

Acknowledgements

We would like to take this opportunity to express our deepest gratitude to the community and all our respondents for helping us in conducting the study and spending their valuable time with us.

We would like to thank our co-workers and field coordinators for their valuable inputs and for ensuring the completion of the data collection process within the deadline.

We would like to thank Smt. Anuradha Talwar and Shri Swapan Ganguly for their continuous support and guidance.

Dr. Aahana Ganguly and Ms. Yamini Unduruthi deserve special mention for their inputs in framing the study and for coordinating the survey which was undertaken over a period of one month.

We would like to thank team CFA for providing us with the opportunity to conduct this extremely relevant study and for supporting us throughout the journey.

Last but not the least, we would like to thank the members of the secretariat team of Paschim Banga Khet Majoor Samity (PBKMS) for their help and cooperation.

Tapojay Mukherjee and Ishita Bhattacharya

Table of Contents

Introduction

The Indian Sundarban region consisting of 4,200 square kilometres (sq km) of reserved forests along with 5,400 sq km of non-forest area (a total of 9,600 sq km) lies in the districts of South and North 24 Parganas in the Indian state of West Bengal. The entire area is a conglomeration of river channels, creeks and about 102 islands. Only 54 of these islands are inhabited and the rest 48 islands are forested (Directorate of Forests Govt. of West Bengal, 2021). Ramsar Convention, the only global treaty focusing specifically on the conservation of wetlands, lists the Sundarban National Park (core zone of the reserved forests) as a wetland of international importance (Suman, 2019).

The rich biodiversity of the Sundarban nurtures more than 350 species of vascular plants (including mangrove associates), 250 species of fishes and 300 species of birds, besides numerous species of phytoplankton, fungi, bacteria, zooplankton, benthic invertebrates, molluscs, reptiles, amphibians and mammals. Amongst the insects, honey bees occupy an important position in the local economy; contributing honey and beeswax in large quantities. Sundarbans is characterized by a rich estuarine and coastal marine ecosystem leading to a rich harvest of crabs, shrimps, prawns and lobsters. The conversion of large tracts of mangroves into paddy fields and shrimp farms along with reclamation of lands for unsustainable practices have affected the natural habitats of a significant number of species. The International Union for Conservation of Nature states that the present state of the Sundarbans is threatening the only species of tiger found in a mangrove forest, *Panthera Tigris* (Royal Bengal Tiger) along with 20 other faunal species and 17 floral species (Gopal et al., 2006).

Shah Suja, the Governor of Bengal under the Mughal empire, was one of the first administrators to treat Sundarbans as a source of revenue. The reclamation of mangrove tracts for settlement and agricultural practices gained ground in 1737 under the administration of Lord Clive, the first British Governor of Bengal Presidency. In 1879, the British empire in India declared a part of Sundarbans as protected forests which laid the foundation of the establishment of a forest administration with its then headquarters at Khulna (In present-day Bangladesh) in undivided Bengal. After independence, the Govt. of India carved out the Sundarban Tiger Reserve with an area of 4,262 sq km in the year 1973. (Directorate of Forests Govt. of West Bengal, 2021).

In the present times, the Sundarbans has been administratively spread over 19 blocks (13 in South 24 Parganas and 6 in North 24 Parganas) in two districts of Southern West Bengal. The block administrations come under 5 subdivisions (4 in South 24 Parganas and 1 in North 24 Parganas) headed by the respective Sub Divisional Officer. The Department of Forests is in charge of the Sundarban National Park and controls the activities inside the buffer zone. The Sundarban Affairs Department coordinates the state-led development projects between the line departments of the Govt. of West Bengal and the Department of Irrigation, Govt. of West

Bengal oversees the maintenance and construction of embankments. The Sundarban Affairs Department was created to address the relative backwardness of the region inhabited by a comparatively large Scheduled Tribe and Scheduled Caste population with poor communication infrastructure (*Department of Sundarban Affairs, Govt. of West Bengal*, 2020).

The 2011 census reported a total population of 44,26,259 across the 19 blocks of Sundarbans with 22,64,133 and 21,62,126 as the male and female populations, respectively. The percentage of Scheduled Caste population was reported to be 35.76% and that of the Scheduled Tribe to be 5.56%. Agriculture and daily wage labour happen to be the main occupations of the residents in the Sundarbans. Agriculture includes allied sectors like fisheries, livestock and horticulture which sustains the rural households. Forest dependent livelihood options are also pursued along with reliance on tourism-related projects around the buffer zones of the reserved forests. A significant portion of the population has turned into migrant labourers and seek work outside the state of West Bengal. Monthly earnings have reportedly tripled on migrating outside the state to work primarily in the construction and service sectors. Hence, migration has seen a rise amongst the people and now it figures prominently as a livelihood option in the region. One of the chief reasons for such a trend has been the direct fallout of repeated onslaughts of super cyclones in the region, which have had severely affected the lives and livelihood of the vulnerable sections of the population. Economic losses have mounted after such natural disasters and combined with climate-induced changes, agriculture and its allied sectors have suffered from diminishing returns. The rising seawater levels and the constant threat of bank erosion have turned residents into climate refugees which are also fuelling distress migration (The Hindu, 2020).

Climate change is a real threat to the settlements in Sundarbans. Along with the rise in seawater levels, the phenomenon has led to the loss of land including mangrove forests. Mangrove Forest Cover Changes in Indian Sundarban (1986-2012) Using Remote Sensing and GIS, a publication by the School of Oceanographic Studies, Jadavpur University, reveals a loss of more than 124 sq km of mangrove forest cover from 1986 to 2012. Studies conducted with the help of remote sensing techniques had identified 2,246.839 sq km under forests which had decreased to 2,122.421 by the year 2012 (Samanta et al., 2017). Authors Sugata Hazra and Kaberi Samanta said, “The continuation of this process in response to climate change and seawater level rise poses a serious threat to the carbon sequestration potential and other ecosystem services of this mangrove forest in future”. A report presented by the Indian Space Research Organization (ISRO) before the Eastern Circuit bench of the National Green Tribunal in 2015 revealed a loss of 9,900 hectares of landmass to erosion in one decade (The Hindu, 2017).

The study will be placed in such a context to explore the livelihood patterns of the people in Sundarbans as they have evolved over the years.

Literature Review

2.1 Introduction

The aim of this chapter is to review the literature available on the Sundarbans region. It will explore aspects like development, livelihood patterns, challenges of the people residing in the Sundarbans and sustainable livelihood opportunities.

2.2 Studies on Livelihood and Challenges

Sundarbans has always been a land of natural resource-based livelihoods without the option of industrial development, limiting the choices for the local population. The local people rely heavily on the primary sector. The scope for industrial growth or development in this fragile ecosystem is limited.

The fertility of the deltaic islands supports agriculture, while the mangrove forests serve as a natural breeding ground for fish. Besides fishing, agriculture and forest-gathering, people are also employed in wax and honey collection, woodcutting and boat-making, and allied trades and activities. With the increase in population, dependency on natural resources has also increased manifold. Furthermore, commercial enterprises from outside are also known to add pressure on the natural resources of the region.

Agricultural vulnerabilities triggered by fragile geographical location, lack of irrigation facilities, dependence on a single crop and the dearth of alternative livelihood options are some reasons for poverty and backwardness in the region. The topography of the Sundarban region is such that the entire region is not suitable for agriculture. Tidal waves from the Bay of Bengal that bring in saline water from the open sea and the upper sandy gravel bed in Sundarban affect agricultural productivity. A large portion of the land is made of swamps and marshes, the beach or sea face comprises coastal sand dunes, and it is the region that makes up the 'formative' deltaic islands of mudflats that are utilized for both agriculture and housing.

In the protected forests, despite restrictions and regulations, several prohibited activities continue. The present modes and methods of fishing pose several challenges for the environment and the ecosystem of the area. The paper *Impact of commercial coastal fishing on the environment of Sundarbans for Sustainable Development* by Das, M. (2009) assesses and elucidates the severe environmental impact of coastal fishing like loss of biodiversity, negative reflection of infrastructural development, increasing effect of trawling, pollution in coastal waters and so on.

Livelihoods in the Sundarbans need to be more resilient and the resilience will have to be built by acknowledging the unique geography and ever-changing ecology of the region, which the embankments, relics of a colonial policy, fail to do. Moving from agriculture to sustainable

fishing could prove to be a way for the future (Rathore, V., *Creating resilient livelihoods in the Sundarbans, sans embankments*. The Bastion)

2.3 Studies on Development and its Impact on the Sundarbans Delta

With the rising sea level, eating up land in Sundarbans, and shortening of Himalayan glaciers, reducing the flow of fresh river water and subsequently increasing salinity of river - life in Sundarbans is threatened for plants, animals and human beings alike. Flooded farmlands and ponds have lowered the already low income of its inhabitants to the stage of half-starvation and led to an exodus to various cities of India. The book *Knowledge Systems of Societies for Adaptation and Mitigation of Impacts of Climate Change (pp.601-633),* discussed how this had led to the proposal and introduction of projects like luxury tourism at a commercial scale, ship-breaking and petrochemical industries with the "advertised" goal of generating new income avenues of the poor inhabitants and development. But the text goes on to describe how these projects are likely to further harm the fragile environment and life in Sundarbans, and would also damage the Sundarbans economy in the long run. It discussed how Sundarbans residents with no proper training to get these jobs and recreational tours as compared to outsiders can lead to the creation of more socio-economic problems among them.

In the paper *Role of Rural Transport to Infrastructural Development of Indian Sundarbans*, the authors Mondal, B. K., & Bhaduri, S elaborate on how transport and communication have been two crucial indicators of development and the absence of these services in a region indicate towards the region's backwardness. With only 42 km of railway, 250 km of metalled road, and about 170 km of unpaved narrow roads, the authors mention that the Sundarbans region can be recognized as backward in terms of transport and communication. The paper further gives a detailed assessment of rural road development through the upgradation of rural infrastructure in Indian Sundarbans in the light of sustainable development.

A case study on the Bangladesh Sundarbans region, in the report titled *Development and Climate Change in Bangladesh: Focus on Coastal Flooding and the Sundarbans* highlights the importance of the transboundary dimension in addressing climate change adaptation. Adaptation to climate change, the report notes, requires not just local but cross-boundary institutional arrangements. Besides climate change, various other critical threats, which can also be observed in the Indian part of the Sundarbans deltaic region like shrimp farming, illegal felling of trees, poaching of wildlife, and oil pollution critically threaten the fragile ecosystem of the region and already have an adverse impact before significant climate change impacts.

Sundarbans' need for sustainable and resilient development is discussed in detail in the World Bank document *Sundarban in a global perspective: long term adaptation and development.* Sustainable development, it points out, requires managing threats and risks, including climate

change. As climate change is a growing threat to development, sustainability is even more difficult to achieve for many locations, systems, and populations unless development pathways that are pursued are resilient to the effects of climate change. In a biodiversity-rich area like the Sundarbans, resilient and sustainable development under climate change may be thought of as preparing for, coping with, or adjusting to climate changes and their associated impacts. The paper also talks about identifying a methodology that will allow the selection of options keeping in mind a direct trade-off between human activities and biodiversity conservation.

2.4 Studies on Sustainable Livelihood Options

Considering sustainable livelihoods is a way that can help in coping and recovering from various environmental and non-environmental stressors, particularly in ecosystems as fragile as the Sundarbans. Livelihoods can be considered sustainable when they can cope with and recover from stresses and shocks and can provide sustainable livelihood opportunities even for the next generations in the long or short term period (Chambers and Conways, 1991; Carney et. al., 1999; Serrat, 2008).

The paper *Climate Change and Sustainable Livelihood Programmes: A case study from the Indian Sundarbans* very clearly highlights the need for sustainable alternate livelihood options, for the people residing in the Sundarbans, in order to cope with the climate crisis and the increasing salinity in the region. Alternate sustainable livelihood options become even more crucial considering the fact that around 4.5 million people live in and around the Sundarbans mangrove forest and their livelihood security needs to be ensured. The need to generate employment through other non-destructive livelihood options, unlike the ones practised presently and training in skill development are some solutions and suggestions discussed in the paper, to support the local population. It is noted that any adaptation strategy adopted in the area, will require the participation of both global and local communities.

The paper *Prospective livelihood opportunities from the mangroves of the Sunderbans. India* by Datta, Debajit & RN, Chattopadhyay & Deb, Shovik also discusses in detail the existing livelihood opportunities as well as alternative sustainable natural resource-using options, in the ecologically fragile Sundarbans with a human population pressure of more than one million. It elaborates on community-based natural resource management to sustain the ecological and socio-economic balance of the region.

Mistri, Avijit explains the important concept of ’environmental migrants’ in the paper titled *Is the Migration from Indian Sundarban an Environmental Migration? Investigating through Sustainable Livelihood Approach (SLA).* “Environmental migrants are defined as the persons or groups of persons who, for compelling reasons of sudden or progressive change in the environment that adversely affects their lives or living conditions, are obliged to leave their habitual homes or choose to do so, either temporarily or permanently, and who move either

within their country or abroad" (IOM, 2009, p. 19). Migration it is noted is thus a prominent livelihood strategy in Sundarbans. He highlights that one of the best approaches to examine the factors responsible for migration is the Sustainable Livelihood Approach (SLA) and how it can be an integral part of a migration study.

Methodology

The chapter will state the aim of this research at the beginning along with the methodological approach adopted. The chapter will also discuss the method of data collection and the subsequent process of data analysis. Ethical considerations and limitations will be included to present the findings in a definite context.

3.1 Introduction

The study used both quantitative and qualitative tools to examine the research questions and bring in insights from the field. The quantitative part of the study was through a survey with the aim to quantify the trends around broad themes of the study while the qualitative part of the study was used to bring out the nuanced understanding of the themes along with the lived experiences of the community.

The findings of the present report are based on the data collected from the interviews, video testimonies and data collected from 1,205 survey respondents.

3.2 Aim of Research

The following research questions have been addressed in the current study:

- What have been the changes in the livelihoods of the people in the region in the past two decades?

3.3 Sampling Method

The method of enquiry entailed deploying a purposive sampling technique. 16 blocks had been identified across the districts of South 24 Parganas and North 24 Parganas with local youths trained as survey takers to complete the data collection. Middle-aged residents of Sundarbans were identified, for the questionnaire made an attempt to understand the gradual change in perceptions of events over a considerable period of time. People engaged in particular professions were also identified to understand the livelihood patterns in the region.

The researchers partnered with local youth groups and grassroots associations working in the Sundarbans and respondents who gave their consent in taking part in the study were invited to be a part of the research process.

3.4 Data Collection

The duration of data collection was about 45 days in the months of September and October. Video testimonies were collected. Permission for voice as well as video recording was sought from respondents and the interview process(s) was transcribed within a day of the end of an

interview session. 41 participants – from 7 blocks of South 24 Parganas and 3 blocks of North 24 Parganas — consented for the interview who represent a wide range of age groups. Further details have been withheld to protect the identity of the respondents.

In addition, a mobile application-based survey was designed for the study. Youth members of the community conducted the survey in the field areas and a two-day workshop was conducted with them to get them familiarized with the application as well as to seek their suggestions on the questionnaire. Around 1,200 responses were sought from the team which would have been *statistically significant* for the findings derived from the data. Yet, information was received from 1,205 respondents which have been collated in the report.

3.5 Geographical Location

The study was conducted across 16 blocks which collectively determine the geographical limit of the Indian Sundarbans region. These blocks are spread over the districts of South 24 Parganas and North 24 Parganas in Southern West Bengal.

3.6 Data Analysis

The in-depth interviews were transcribed in the field after the completion of interview sessions. Post transcribing of the interviews, the transcripts went through a process of coding to ascertain themes that emerged from the written texts. Sub-themes were engaged to replenish the arguments around the main themes modelled on the central research questions.

The data collected through the survey was cleaned to represent the data mostly through univariate analysis. Bar charts and pie charts have been used liberally along with tabular representations of a few demographic data sets.

3.7 Ethical Considerations

Consent was sought from the respondents and interviewees and anonymity of the respondents were ensured during the transcribing process according to the choices exercised by them. The nature and objectives of the study were fully disclosed to the participants and they were also made aware of the provision of withdrawal at any point of time during the process of the interview.

Major Findings and Discussions

4.1 Introduction

This chapter will draw upon the main themes and present the findings which arose out of the interview process as well as the data analysis of the quantitative data gathered with the help of 34 youth volunteers, who are also permanent residents of the Sundarbans region. 1,205 respondents from 16 blocks across the districts of South 24 Parganas and North 24 Parganas responded to a mobile application based survey.

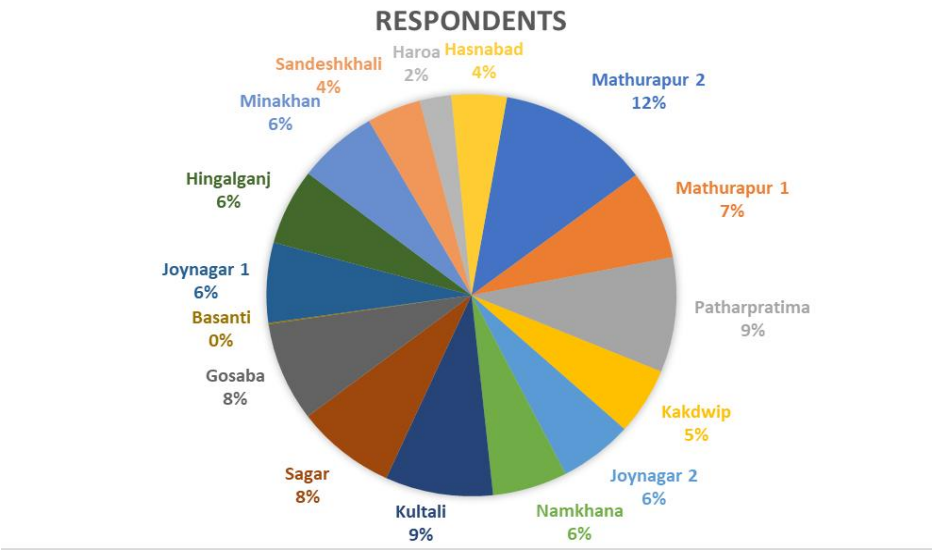
A brief profile of the participants is also presented. The key themes that emerged following data analysis are Changing patterns of livelihood and Perception of development. All of the themes are interconnected and the data analysis leads to a general impact on the lives and livelihood of people in Sundarbans due to climatic factors and social change.

4.2 Demographic Details

Video testimonies were collected from 41 respondents, from 7 blocks of South 24 Parganas (namely - Mathurapur 2, Kultali, Mandirbazar, Patharpratima, Gosaba, Joynagar 2 and Namkhana) and 3 blocks of North 24 Parganas (Basirhat, Minakhan and Hasnabad).

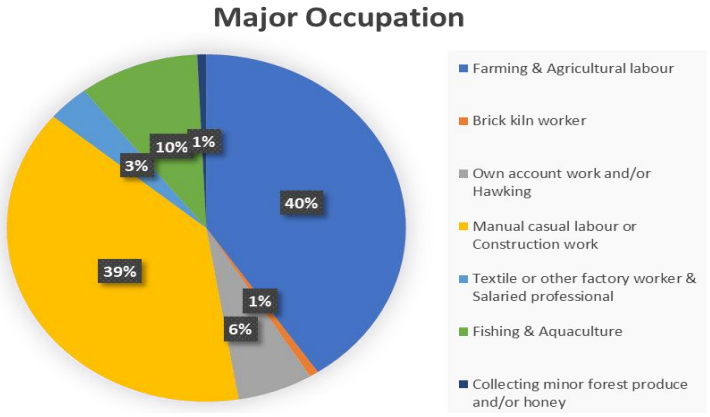
Quantitative data has been collected from 1205 respondents, with the help of a mobile application-based survey, designed for the study.

Out of the 1,205 respondents we collected information from, 334 people were residents of 5 blocks of North 24 Parganas and 871 people were from 11 different blocks of South 24 Parganas. The blocks were divided into urban areas and forested, coastal or island areas. The blocks namely- Minakhan, Haroa, Hasnabad from North 24 and Joynagar 1, Joynagar 2, Kakdwip and Mathurapur 1 from South 24 were categorised into urban areas. The blocks Hingalganj and Sandeshkhali 1 from North 24 and Basanti, Sagar, Gosaba Patharpratima, Kultali, Namkhana and Mathurapur 2 were classified as forested, coastal or island areas, that often bears the brunt of nature's fury.



74.27% of the respondents of the survey were male and the remaining were female.

The majority of the respondents (40%) said they are involved in farming or agriculture-related activities. This was closely followed by people working in construction or as manual casual labourers (39%). The number of respondents working in brick kilns or collecting forest produce and/or honey was very low, according to the data gathered in the survey. Only 3% of people said they are engaged in a more organised sector of work like textile or other factories or are salaried professionals. 6% of respondents mentioned being self-employed or involved in hawking.

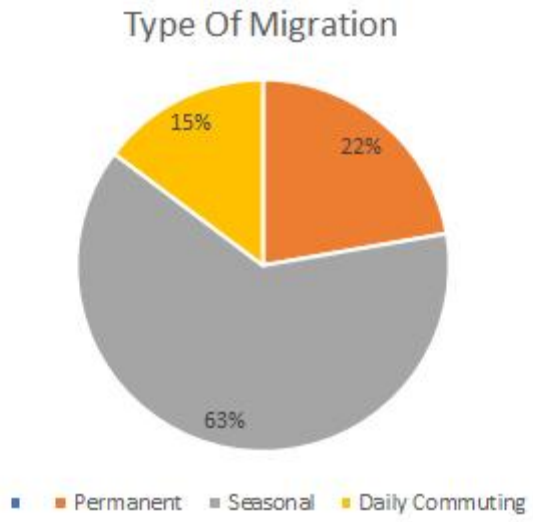


4.3 Changing Patterns of Livelihood

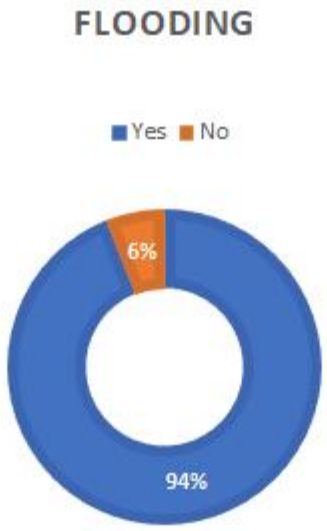
The respondents have all felt the gradual change in livelihood in the region which has been expedited by macroeconomic factors and extreme climatic events. Extreme flooding and recurrent occurrences of cyclones have led to huge losses in assets and properties.

Fig. 1: Flooding in a village in Patharpratima, South 24 Parganas

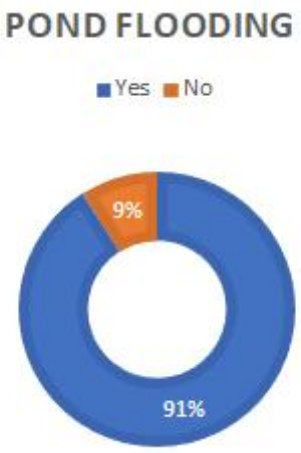
Migration has been one of the important phenomena experienced by the region and the below graphical representation presents the different types of migration reported from the region. Seasonal migration has been found to be the most dominant form of migration.



Such events have a negative impact upon the agriculture and allied sectors of the economy which have led to distress migration from the region. Flooding events have seen an increase over the years with flooding of villages turning into a routine affair. 94% of the respondents have corroborated the statement highlighting the severity of one of the important climate change events in the deltaic region.



An overwhelming affirmative response (91%) has been noted on flooding of village ponds which is a direct consequence of the increase in precipitation in the region over the years.

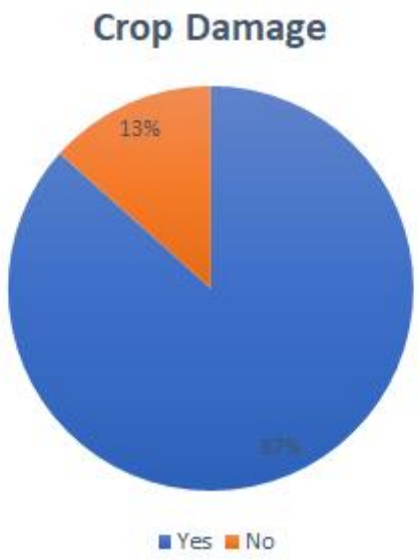


Agriculture being the primary economic activity in the region, the small and marginal farmers (who are not in possession of more than 2 hectares of agricultural land) along with the agricultural labourers face the brunt of reduced earnings originating from adverse climate change events. The small and marginal farmers generally practice subsistence agriculture which in case of a bad crop affects their food security in addition to a loss of income to meet the input costs of the standing crop. A reduction in income from agricultural fields also impacts agricultural labourers who are chiefly from vulnerable social groups. Work in agricultural fields are also seasonal in nature and depressing wages further compel them to migrate as manual casual labourers. Skilled and semi-skilled labourers have also reported a dearth of opportunities

and lower wages even in the urban centres of West Bengal which force them to migrate to other states.

Aparna Tanti, a 35-year-old homemaker from Mathurapur-2 block said, "*karkhana se bhabe nei je kajer bebostha hobe. Cheleder baire chole jete hoy r meyera lekhapora koreo barite bose ache*" (There are not enough factories to enable the youths to seek work in the region. Men have to migrate while women, despite receiving formal education, have to remain at home). The statement signifies the lack of opportunities in accessing wage based employment owing to less demand from the local industries, which is incapable of supporting the youth population seeking an exit from the agriculture and allied sectors. Subhas Acharya, the ex-joint director of Sundarban Development Board stressed on the lack of thrust of policymakers on employment creation when he said, "*Unnoyon toh hoyeche kintu porjapto kajer sujog toiri hoyini. Lekha pora sikhe ki ar khet mojurir kaj korbe shobai? Kajer sujog se bhabe kichui nei*" (Development has taken place over the years but the creation of employment opportunities has not been seen in this region. People can't be expected to work as manual casual labourers after receiving formal education. There is little scope for accessing work in industrial settings).

A gradual shift from agriculture and its allied sectors to construction and service sectors could be felt clearly which was corroborated by numerous respondents. The primary reason is the volatility of the sector in guaranteeing a standard income for the household which has been further compounded by extreme weather events leading to crop damage and loss of assets. 87% of the respondents in the survey confirm crop damage suffered over the last year leading to depressed incomes of the farming community.



A 68-year-old farmer who didn't wish to be named said, "*Chas bas ar ager moton nei. Aager moton folon hoi na ar rojgar o onek kome jaye. Loksan hoy prayei*" (The yield from agriculture has decreased over the years and income has also gone down. We frequently suffer losses).

Increased propensity for mechanization of relatively large agricultural farms has affected the demand for agricultural labourers leading to migration as casual labourers to labour intensive sectors. "*Boro chasira ekhon harvestor ar tractor bebohar kore. Aager moton ekhon ar khete lok lage na*" (Mechanization has taken place resulting in big farmers using combine harvesters and tractors in their lands which have decreased the demand for agricultural labourers) have often been repeated by the respondents.

Sukumar Mitra, senior journalist and author said, "*ekhon bohu jomi ek fosili hoye okhane r crop intensity 1.2. Landholdings o khub choto jar jonno khet mojur der kajer sujog nei bollei hoy. Chasira nijerai sob kore ney. Khetmojur ra din mojuri korte rajjer baire chole jete baddho hocche jar jonno onek gram okhane ekhon purush shunno. Mohilara local train e kore Baghajatin, Garia, Ballygunge, Park Circus er moton jaygaye ese poricharikar kaj korche*" (The cropping intensity in Sundarbans is now 1.2. Many agricultural lands are now mono-crop with small landholdings diminishing the prospect of providing wage employment to agricultural labourers. Hence, they are resorting to distress migration and many villages can be found bereft of male members. The women can be found to engage themselves as domestic workers in the middle-class and upper middle-class localities of Kolkata like Baghajatin, Ballygunge, Park Circus and Garia). Migration patterns point to the interstate migration of the menfolk while women have been found to be restricted to intra-district migration, with Kolkata being the most preferred destination owing to proximity, railway connectivity and demand for domestic workers.

The volatility of the agriculture and allied sectors in terms of financial returns and the ability to meet the nutritional requirements of a household have led to a gradual shift to wage-based employment in other sectors which is often seen as a more 'secured' form of livelihood. The proliferation of formal education in the community, including vocational and skill-based training programmes, have led to demand for employment opportunities in industrial settings which also have a certain social status attached to them. "*Chas bas e ar labh hoy na. Tarpor ekhon chelera lekha pora korche. Tara ki ar din mojuri korbe naki amra lekapora shikhiyechi ei jonne. Ekhane kono bhalo kajer sujog nei*" (Farming is no longer profitable. The youth are receiving education and they do not like taking up assignments as manual casual labourers. We also do not want them to do these jobs. We have not educated them to see them work in the fields and as manual labourers. Here the scope to access 'good' work opportunities is extremely limited) said Biplab Sardar, a middle-aged small farmer.

Fig. 2: A woman fishworker in Sundarbans

The communities dependent on forests are also facing a reduction in earnings along with a decrease in access to natural resources which further increases their woes from having to venture deep into the forests and to invest in tools that were earlier not necessary. "*Ekhon r kacha kachi kakra ba choto maach pawa jay na. Onek bhetore jete hoy, samudre jete pari na amader jal nei bole. Ja maach pawa jaye ta beche ghore kichu ase na*" (Earlier we used to get access to small fishes and crabs in nearby streams and shores. Nowadays we have to venture deep into the forested areas to catch them. We can't go out in the sea for fishing due to the lack of specialized fishing nets. The money earned through the fish catch (shallow water fishing) is too little now) said Bivash Dolui, a middle-aged small scale fisherman from Gosaba.

The intricate relationship between the health of the ecosystem and the non-viability of the livelihood opportunities directly related to natural resources which can be broadly classified under the category of agriculture and allied sectors suffer disproportionately.

"*Brishti bhaalo porimaane bereche, ekhon prokriti khub khotikor hoye utheche. Aage kal boisakhi aar ashwin masher jhor, bojha jeto; kintu ekhon jhor khub khoti korche*" (Rainfall has increased and natural events have become more destructive in general. In earlier times, the nor'westers and storms in September-October (Ashwin or the 7th lunar month in a Hindu calendar) were predictable but now the storms have become more destructive) said Dukhiram Sardar, an aged farmer from Hasnabad in North 24 Parganas.

The loss of tree cover and its adverse effects has been brought out by respondents which might have also contributed to the river bank erosion due to the loosening of the topsoil layer due to erosion. "*Bonya besi howar karon gaach kom, oneke jongol theke churi kore niye jaye gach, keu dekhe na*" (One of the reasons for increase in flooding events is the decrease in tree cover. Trees are illegally felled in the forests and there is virtually no surveillance to check it) said a marginal farmer from North 24 Parganas.

"Sagar, the biggest island of the Sundarbans, having 2 lakh people is facing severe erosion on its western and south-eastern parts. The same trend can be observed in Jambudwip and Henry islands. Other than the natural processes like storms and sea level rise, anthropogenic factors like spread of aquaculture, port construction and other developmental activities also lead to coastal erosion, say experts" (Singh, 2018). Despite such concerns, the inhabitants of the deltaic region are averse to shift to high lands and resettle in areas farther from the coast owing to their dependence on livelihood activities like weaving and repairing of fishing nets, construction and repairing of small boats, etc.

Pollution has also come up in the discussions with the respondents mentioning its adverse impact on the environment of the region. "*Dushon onek bere geche, aager moton poribesh ekhon ar nei. Plastic er bebohar khub bereche, charidike sudhu packet pore thake. Nikashi bebostha khub kharap hoyeche er jonne*" (Pollution has increased and the environment is not like what we have experienced before. The use of plastic has increased a lot and everywhere one can find plastic packets strewn across the region. This has affected the drainage region) said Munawara Bibi, an agricultural labourer from North 24 Parganas. The correlation between the decrease in species of fishes along with the shift of habitat of the crab population and the falling quality of water in the rivers and other water bodies has also been stated by a few respondents. "*Jol ekhon onek kharap hoye geche. Aage pukurer jole khele shorir o kharap hoto na. Nodir jol onek jaygaye kalo hoye geche. Maach shob chole geche, kakra rao jongoler bhetorer ongshe chole jacche*" (The quality of water in water bodies has decreased. Earlier we used to drink pond water and it was safe. Now the water has even turned black in some of the stretches of the river. Fishes are no longer available and the crabs are also moving to the deeper parts of the

deltaic forests) said Haradhan Mondal, an agricultural labourer from Gosaba. The general deterioration in environmental conditions has also been repeatedly mentioned by the respondents with the words of Mr. Barun Mondal, a marginal farmer from Kultali summing up the mood of the local residents. "*Aager poribesh firiye ante hobe, nahole ar kichui bachbe na. Ei dustito poribeshe kichhu bachbe na. Aage poribesh ki aramdayak chilo! porishak hawa, porishkar jol…..ami toh ar ajker manush na. Dine dine kharap hoye jacche*" (We have to take steps to ensure that the environment gets healed and goes back to the earlier state. Otherwise nothing will survive in this polluted environment. Earlier, it used to be so comfortable, clean water, clean air and what not. I am from the older generation. I am witnessing the gradual degradation over all these years) said the septuagenarian.

4.4 Perception of Development

The thrust on development of infrastructure over the years has led to the construction of all-weather roads, jetties, bridges and related facilities which have been corroborated by the account of Mr. Subhas Acharya, the former joint director of the Sundarbans Development Board, as he narrated the flow of money even from international financial institutions to the likes of Asian Development Bank for infrastructure projects. On the face of it, the state-led development chiefly through investing in road infrastructure and in ensuring better access to health and education has been welcomed by the respondents. The region has witnessed an improvement in access to social infrastructure and road as well as railway connectivity over the years which has contributed to increased mobility. "*Ekhon Kolkata e jedin gelam, sedin ei phire asa jay. Jatayater onek subidhe hoyeche. Train er sonkhao onek bereche*" (Nowadays, one can travel to Kolkata and return on the same day. Travelling has become easier. The availability of trains has also improved), said Ramen Halder, a small farmer from Kultali in South 24 Parganas.

The upgradation of the road network and access to mass transit systems in the form of passenger trains and buses have led to increased mobility of the people in Sundarbans. Access to urban centres from the interiors of the region has improved and connectivity to Kolkata, the capital of West Bengal and a metropolitan city has also witnessed great improvement. This has resulted in better mobility thereby increasing opportunities and choices in accessing services.

Now, there are even degree colleges in all the sub-divisions in Sundarbans with tertiary medical facilities being established at the block or taluka level. Anganwadi centres, primary schools, secondary and higher secondary schools have also come up in large numbers. This has led to improvement in quality of life of the residents through increased mobility and better access to social infrastructure. "*Kono unnoti hoyni ta na. Jatayater onek subidha hoyeche. Paka rasta hoye geche. Bridge onek hoyeche. Aage toh nouka chara jawa jeto na. Bidyut eseche. Haspatal aager tulonaye bhalo hoyeche, porishar onek besi ekhon. Aage shobai baire jeto shokale. Ekhon sob barite ekta theke duto paikhana ache ekhon. Aage padaye khub besi ekta tubewell thakto, ekhon tirish theke chollish ta hoye geche*" (It's not that no development has taken place

over the years. Now there are all weather roads. Bridges have been built which have allowed us to be less dependent on boats. Electricity connection has reached us. The conditions of hospitals have improved and cleanliness has seen a marked improvement. Every household now has one to two toilets which was not the case earlier. We now have thirty to forty tubewells in our localities as compared to at most one in the previous days) said Mr. Barun Mondal, a marginal farmer from Kultali in South 24 Parganas.

The region has also seen an influx of consumer goods and rising demand for convenience goods in the FMCG (Fast Moving Consumer Goods) segment. Mr. Subhas Acharya said, "*Ekhon jiniser chahida onek bere geche, aage erom chilo na. Kolkata r mudei dokane ja pawa jaye ekhon Sunderboner dokaneo tai pawa jay. Ja rojgar hoy tate poribarer shok allad ar mitche na. Cheleder opor chap barche baire giye kaj korar jonne*." (The demand for consumer goods has increased as compared to the earlier times. The goods stocked in a grocery shop in Sundarbans can now be compared to one in the city of Kolkata. The average income of a household is not enough to meet the aspirations of the family. There is an increased social pressure on men to migrate for better wages).

"*Ekhon jibon jatra orom aar nei. Chahida ekhon onek bere geche*" (Lifestyles have changed. Demand for consumer goods has increased a lot….) summed up by Mr. Dukhiram Sardar, an aged farmer from Hasnabad in North 24 Parganas.

The development in terms of access to social infrastructure has not necessarily led to increase in wages and opportunities to seek work in the region. The average income of agricultural labourers and the returns on produce of the small and marginal farmers have not seen any significant improvement. Not enough skilled employment opportunities have come up for graduates and time and again the respondents have highlighted the lack of suitable opportunities for the educated youths of the region. "*Kormosongosthanheen unnoyon hoyeche, chelera Kerol jacche narkel padte gach theke, kaj kothay ekhane?*" (A jobless growth has been experienced. Men are migrating to Kerala to pluck coconut from the trees due to better wages. Where are suitable opportunities here?) asked Mr. Subhas Acharya.

The dearth of opportunities that offer better wages has been highlighted by many respondents as an antithesis to the improvement in infrastructure which forms the narrative of development in the region. The development has also been primarily led by the state in the form of funds allocated to the Department of Sundarban Affairs and also from the grants the region received from international finance organisations. Mr. Subhas Acharya said, "*Sorkari udyog chara biniyog se bhabe hoyni*" (There has not been significant private sector investment and only government funds for development projects have flowed into the region). The lack of private sector investment has led to fewer opportunities in industries and trade and commerce.

Eco-tourism projects also have not been able to have any significant impact on the household incomes around the buffer zone of the Sundarbans reserve forests. The lack of initiative to involve the local community to the extent expected out of such projects may have been a factor. The limited involvement of the local community has also led to a loss of the essence of an eco-tourism project which possesses the potential to even impact the sensitive ecology of the region in a negative manner. Respondents have hinted at such developments during discussions on rising pollution levels and the massive influx of tourists leading to plastic pollution. Hence, the spurting up of quite a few tourist lodges and resorts have not contributed to the well-being of the local population and have just financially benefited a few individuals higher up on the social ladder.

Conclusion

The region of Sundarbans is witnessing a gradual decline in crop productivity with increasing dependence on chemical fertilizers which has resulted in increasing the input cost of crops. Such an increase in costs has affected the returns from farming. Subsistence farming and hindrance in accessing government operated 'mandis' have placed hindrances in accessing the benefits of the MSP (Minimum Support Price) mechanism. Hence, the youth has made a conscious choice to move away from agriculture as the primary occupation. The shrimp processing and packaging units, a few manufacturing units and construction activities in the nearby areas provide the major avenues to seek non-farm activities in the region. Seasonal migration has been found to be endemic in the region with migrant workers moving to the Western and Southern states of India to seek opportunities as semi-skilled and skilled labourers.

Efforts of the Sundarban Development Board and the proximity of a large part of the Sundarbans to Kolkata have led to a spurt in educational opportunities for the residents. Even avenues to seek technical education in the form of vocational courses and industrial training courses have increased. The lack of suitable opportunities on the other hand has led to the search for employment in Kolkata and in the urban centres of other states which have, in turn, led to out-migration. Availability of comfort goods and exposure to mass media have raised the aspirations of people in striving for a better standard of living. The agriculture and allied sectors have not been able to provide returns to enable the practitioners to access even basic necessities, let alone the comfort goods. Hence, a noticeable yearning to push future generations to the service sector could be experienced. Households allocating a significant portion of the assets to afford technical education, especially for male children could be witnessed. Lack of suitable white, as well as blue-collar job opportunities, dominated the conversations around livelihood which signify a definite shift in preferences.

The agriculture and allied sectors have also been impacted due to climate change which has been brought up time and again by the respondents, particularly those whose primary source of livelihood(s) falls under this category. A close relationship between the destruction of natural resources and the dominant narrative of development could be established with construction activities and changing patterns of living affecting the flow of rivers and leading to clogged natural drainage systems. Pollution has also figured in the discussions with eco-tourism projects and increased tourism activities frequently being highlighted to establish the rising impact of activities of the people in the buffer zones of the Sundarban reserve forest. A direct impact could be seen on the livelihoods of small fisherfolks for the yield of catch has reduced significantly over the years. The ferries that carry people from the nearby 'ghats' (river platforms) to the periphery of the mangrove forests for providing tourists with an experience of the forests, lack sewage treatment facilities and dump all the wastes in the water. This has led to the departure of common varieties of fishes and some species of crustaceans which were the

lifeline of the small scale fisherfolks and crab collectors. Connivance between the forest authorities and a section of wood smugglers have also been highlighted leading to the deforestation in core zones of the forest and loss of mangrove cover over the years.

The lack of efforts in industrialization or arrival of mega-projects has led to minimal growth in white and blue-collar jobs in the region which has led to outmigration to Kolkata, the nearby metropolis and to states, mainly in western and southern India. The young respondents have rued the unavailability of suitable formal sector job opportunities and have highlighted the lack of opportunities even after pursuing technical education through vocational courses. Agriculture and allied sectors are masking hidden unemployment with youth groups often not considering them as suitable livelihood options.

State-led spending has contributed to better infrastructure facilities with little improvement in job opportunities for the local population. The shift in penchant to access consumer goods and a better standard of living are compelling the youth to migrate out for seeking opportunities, primarily in the service sector. The livelihood patterns are going through a period of transformation with the preference of the youths shifting from the agriculture and allied sectors primarily to the service and manufacturing sectors.

Bibliography

Journals:

Suman, D.O. (2019). Mangrove management: challenges and guidelines. In Coastal Wetlands (pp. 1055-1079). Elsevier

Directorate of Forests Govt. of West Bengal. (2021). Wildlife Wing:: Directorate of Forests Govt. of West Bengal. http://www.wildbengal.com/sundarban.php

Gopal, B., & Chauhan, M. (2006). Biodiversity and its conservation in the Sundarban mangrove ecosystem. Aquatic Sciences, 68(3), 338-354.

Andharia, J. (2020). A web of Vulnerabilities: Eco-fragility, Poor livelihoods and cyclones in SUNDARBAN Region, India. *Disaster Studies,* 357-374. doi:10.1007/978-981-32-9339-7_17

Department of Sundarban Affairs, Govt. of West Bengal. (2020). DEPARTMENT OF SUNDARBAN AFFAIRS, GOVERNMENT OF WEST BENGAL. https://www.sundarbanaffairswb.in/home/page/about_us

Samanta, K., & Hazra, S. (2017). Mangrove Forest Cover Changes in Indian Sundarban (1986–2012) Using Remote Sensing and GIS. In *Environment and Earth Observation* (pp. 97-108). Springer, Cham.

Articles:

Rathore, V. (2020, June 10). Creating resilient livelihoods in The SUNDARBANS, SANS EMBANKMENTS. Retrieved July 15, 2021, from https://thebastion.co.in/politics-and/creating-resilient-livelihoods-in-the-sundarbans-sans-embankments/

Singh, S. S. (2017, July 1). Climate change impact: Sunderbans steadily losing its famed mangroves. *The Hindu*.

PTI. (2020, May 23). Sundarbans stares at bleak future, fresh wave of migration. *The Hindu*. Kakdwip, West Bengal

Singh, S. S. (2018, September 1). West Bengal, where erosion leads to land loss. *The Hindu*. https://www.thehindu.com/sci-tech/energy-and-environment/west-bengal-where-erosion-leads-to-land-loss/article24842375.ece

Centre for Financial Accountability (CFA) engages and supports efforts to advance transparency and accountability in financial institutions. We use research, campaigns and trainings to help movements, organisations, activists, students and youth to engage in this fight, and we partake in campaigns that can shift policies and change public discourse on banking and economy.

We monitor the investments of national and international financial institutions, engage on policies that impact the banking sector and economy of the country, demystify the world of finance through workshops and short-term courses and help citizens make banks and government more transparent and accountable, for they use public money.

CFA

Centre for Financial Accountability