International Journal of Research Studies in Science, Engineering and Technology
Volume 2, Issue 10, October 2015, PP 17-23
ISSN 2349-4751 (Print) & ISSN 2349-476X (Online)

A General Overview of the Society and the Livelihood Pattern of the Sunderbans, South 24 Parganas, West Bengal, India

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Abstract: *Though UNESCO had defined the region as 'World Heritage Site' in the year 1987 but still the Sunderbans is the most disaster prone part of West Bengal. Not all but the reclaimed part of the region is mainly susceptible to vulnerability. The region stretches over both India and Bangladesh but the eastern most part of it is less vulnerable. Spill over of saline water and failure of embankment is the two agonizing effects the inhabitants face every year. Agriculture is the main stay of livelihood but the menace that is caused every year leaves the land infertile. Inland fishing is also being threatened by spill over. Disaster usually results into inundation of agricultural fields and ponds, loss of lives and loss of property as well. Income shock on regular basis has compelled the inhabitants to look for alternative livelihood.*

Keywords: *embankment, emigration, reclamation, spill over.*

1. INTRODUCTION

Both climatic and tectonic hazards are very common in the Sunderbans but the frequency of tectonic hazard is less as compared to climatic hazards. There has always been a crisis for mitigation in the West Bengal part of the Sunderbans. Spill over of saline water and failure of embankments just after the monsoon season in July-August ('*Bhadra*' in Bengali Calendar) full moon days (*Bhara Kotal*) are the real threats in this region as the rain fed rivers carry excess volume of water and the '*Bhara Kotal*' increases its volume that results into spill over. Agriculture being the main stay of livelihood, mono-cropping is practised depending on rain water as irrigation is impossible. Intrusion of saline water and flooding usually result into long term infertility of soil and loss of crops that ultimately affect the local economy. Though the Sunderban delta has been listed as *World Heritage Site* by UNESCO in 1987 for the uniqueness in its floral and faunal strength, intricate coastline, innumerable islands, innumerable criss-cross distributaries and a very different culture of the inhabitants frequent occurrences of such disaster have compelled the inhabitants to search for alternate economy. Rich biodiversity, detritus ecosystem and dependency on tidal oscillation have made this part of the world very different. *'Aila'* in 2009 had taken a huge toll in terms of ecological as well as economical balance. It had surpassed all previous records of damages. The government has also admitted that embankment is the only *'lifeline'* to the inhabitants and strengthening of embankment is the only way out to save 5 million populations residing over here.

2. THE STUDY AREA AND ITS PROBLEM

The district is vast enough and it is difficult to study all the blocks. Meetings were held with BDOs and his officials. Vulnerable mouzas had been identified, visited and blocks like Sagar, Patharpratima, Gosaba, Basanti and Kultali were chosen. Their status was verified from available secondary data for a proper understanding of the man water interface in the Sunderbans. The orientation of the blocks studied follows a pattern. It includes the south western extreme Sagar Island, the north eastern extreme Gosaba, and Basanti, Patharpratima, Kultali in between. Sagar being the largest island and also with varying characteristics at various corners the sample data collected is large covering four mouzas viz. Dhablat, Sibpur, Beguakhali and Kachubaria. Mainly the vulnerable portions were covered. In Patharpratima Gobardhanpur was surveyed as it was the most affected mouza during

'aila' in 2009. Household survey was done in Maipit of Kultali Block, being Bay of Bengal facing mouza it is the most vulnerable one in this block. In Gosaba Kachukhali is the mouza which is vulnerable and studied. Other mouzas like Pathankhali in Gosaba and Lot 126 in Basanti were also surveyed as part of less vulnerable section. Vulnerability and less vulnerability were assessed from the perspective of the villagers while they were verbally interrogated and later supported by available secondary data like District Statistical Handbook, 2010-11 and 2012 of the South 24 Parganas, satellite imagery and various reports.

3. Data Source and Methodology

The study involves mainly primary data collected from household survey on *'Random sampling'* basis so that the actual representation of the data gets reflected. Secondary data was also consulted. Sources of secondary data have been Census of India (2011 and 2001), district gazetteer, district statistical handbooks (2011-12 and 2009-10), mouza maps, topographical map (1967), satellite imageries (landsat) etc.

4. Results and Discussion

Because of the interface of fresh and saline water, terrestrial and marine bio-diversity the Sunderbans no doubt has a unique ecosystem. Significant erosion and accretion is taking place simultaneously and thus the shoreline is being modified along with modification in human practices *(Hajra et al, 2014).*

Mostly agriculture is practised in most of the Sunderbans in spite of several threats. Other mouzas are there where the population depends mainly on offshore fishing though agriculture is also in practise but uncertainty because of hazards doesn't allow it to thrive more. Inland fishing is also of less importance as admixture of saline water with fresh water happens frequently. When the dynamic interplay of the nature is accompanied by adverse anthropogenic interference the balancing mechanism of the coastal zone gets disrupted and the society gets threatened.

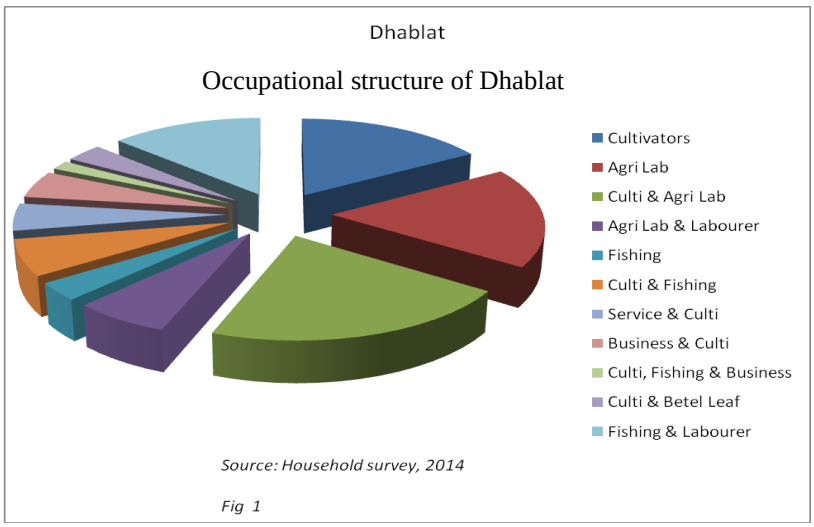
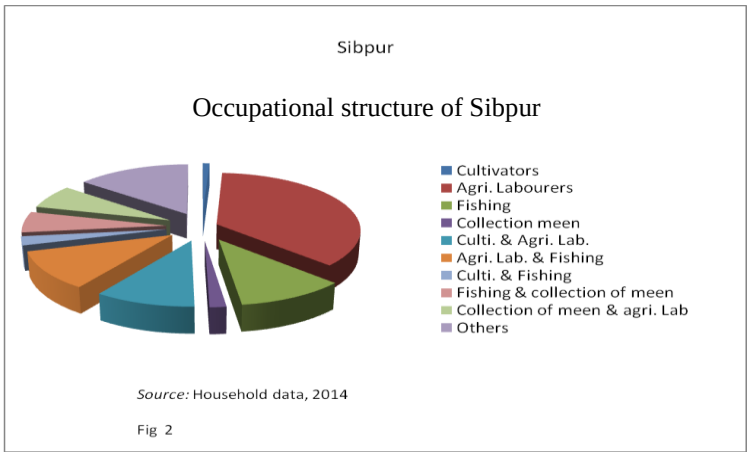
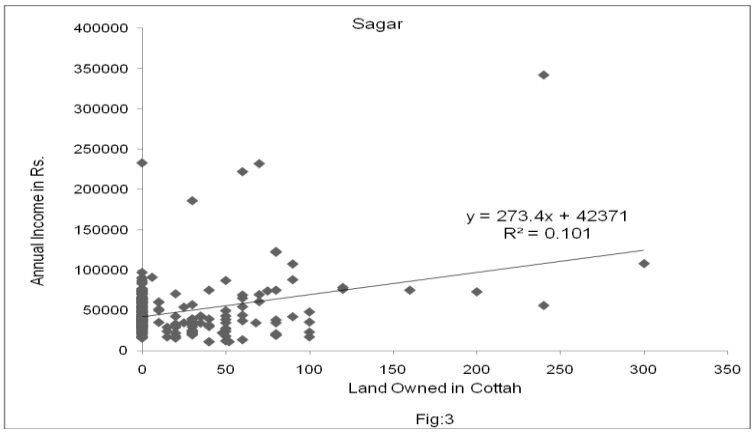


Fig 1

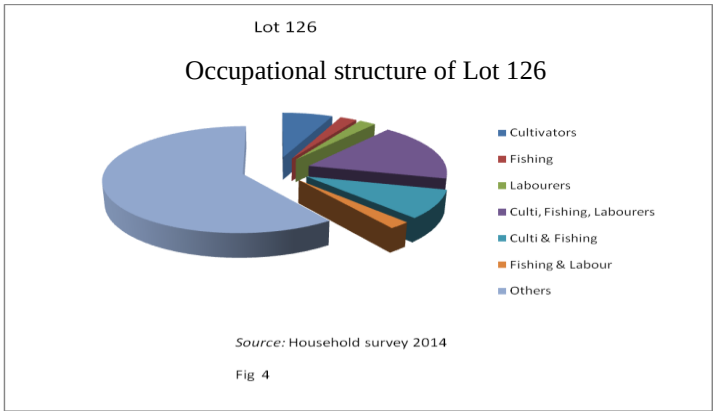
In Sagar a variety is found in the distribution of occupation. Here four mouzas have been studied and interestingly it is noted from the census data that Dhablat is the only mouza where agriculture dominates and other occupations like fishing, labourer also thrive. It is the most vulnerable mouza of Sagar in recent times. It was inundated during an untimely tidal upsurge in 13th July 2014 that swept away agricultural land and houses in considerable numbers. So a huge population is now left with no land in their possession and are jobless as revealed according to the household data collected during October 2014 as the population depends mostly on agriculture, being it is done by main worker or marginal worker. In Dhablat agriculture is being done either exclusively or along with other activities. On the contrary in Sibpur *(fig 2)*, Beguakhali and Kachubaria the ratio between workers and non workers are almost same. As the society is mainly agrarian in Sagar the relationship between land holding and annual income is overall positive *(fig 3).*





Income landholding relationship in Sagar

Reclamation work at Lot 126 of Basanti had been initiated long after independence under the supervision of the government in order to resettle the immigrants from Bangladesh during '70s. Majority depends on agriculture here *(fig 4)*. Other occupations in the Sunderbans include fishing, both inland and offshore, catching of prawn fingerlings, collection of fuel wood, collection of honey and wood from forest, catching of crabs, running village shops, driving vans, repairing of roads and embankments, labour in brick kilns, services etc. There is an intricate dependency on forests either it is for collection of honey or wood or for catching of crabs. Initially there was no restriction in exploiting forests. The ecosystem of the region was assaulted since very beginning of human intervention. Since 1890 the region is under protected forest regime though clearing for settlement or cultivation is permitted following government supervision. Nowadays only licensed contractors are given permission to cut timbers down. In case of collection of honey the Government issue entry passes for the core area though unofficially a lot is being exploited. However the rivers and rivulets outside the forest core area and elsewhere in the eco region remain open to fishing. Fishing is restricted only in the forest buffer area. Though encroaching into the forest is always very risky but people are tempted to do so for years as this seasonal profession bring profit like no other job. Marginal workers of Pathankhali, Maipit are worthy to be mentioned in this respect.



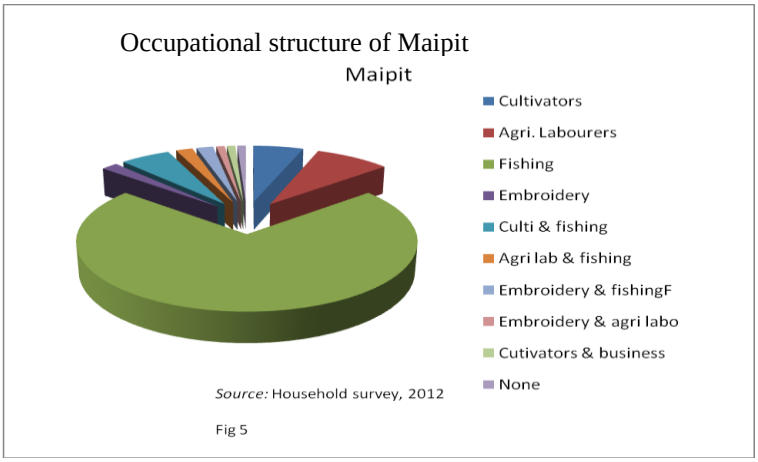


Fig 5

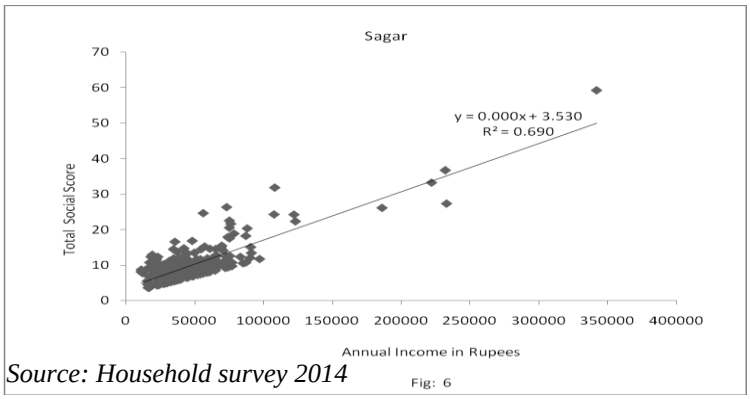
Fishing, inland and off shore, is the second important occupation in the Sunderbans. In few localities, close to the sea, it is the primary occupation. Though the inhabitants of the region are traditional cultivators but frequent disaster, uncertainty in agriculture, close proximity to water bodies had forced them to adapt fishing as an occupation. On the other hand they had explored and experienced that fishing could enable them to get more profit than cultivation which had ultimately resulted into such a shifting in occupational pattern. Among the studied mouzas maximum involvement of population in fishing is found in Maipit of Kultali *(fig 5)*. Inland fishing is done all over the region on subsistence basis but off shore fishing is done commercially. In Lot 126 of Basanti along with offshore fishing shrimp farming is done commercially. In Kachubaria, Beguakhali and Sibpur of Sagar off shore fishing has become an alternative to agriculture. Pathankhali, Lot 126 and Kachubaria have dependency on secondary or tertiary activity than primary activity.

The collection of prawn fingerlings or *'meen'* in the Sunderbans significantly limits the abundance of adult shrimp available for capture fishery. Furthermore, high levels of by-catch of other species discarded by catchers negatively affect other capture fisheries. Shrimp farming adversely affect the mangrove eco system and compromise with the safety of communities exposed to natural disasters. There are a number of ways local stakeholders are affected by shrimp aquaculture. Landless communities often lose access to natural resources, which limits their ability to generate a livelihood. Others gain direct or indirect employment from the shrimp aquaculture industry. This stakeholder group is primarily comprised of marginalised women who are paid little for their effort, and who are often exposed to health problem associated with fingerling collection. Though this occupation contributes a lot in economic output of the region it is so unorganized that the turnover is not reflected significantly in family income. It is practised almost all over the Sunderbans *(Pilot livelihood assessment study of prawn fingerling catchers in the Sunderbans- A report, 2007)*.

We came across different varieties of occupations practised by the inhabitants of the Sunderbans to keep their livelihood on move. From the household survey data we get to acquire information about the available infrastructural facilities, amenities they use, literacy status, income, common diseases, perception regarding embankment and many more.

As already mentioned all the mouzas are not equally vulnerable and the degree of dependency on agriculture or fishing is also not same everywhere. As a result livelihood status varies. So the dominancy of different income group is found in different mouzas. Mouzas, where offshore fishing is an important occupation, are in a well off position than mouzas dominated by agrarian community especially after *'aila'*. Dhablat of Sagar, Gobardhanpur of Patharpratima and Kachukhali of Gosaba are the mouzas where agriculture dominates and in all these mouzas the economic condition of the inhabitants is below average.

From the data collected from household survey during 2011 to 2014 various income classes are identified and the amenities available in the villages are denoted by scores. Thus the total score is calculated and correlated with income and distance from embankment *(fig 6)*. Correlations are also drawn between income and amount of land owned, income and distance of households from embankment etc. Considering the relationships thus obtained an effort has been given to ascertain the socio economic status of the study area.



Source: Household survey 2014 Fig: 6

Annual income and social Score relation in Sagar relation Relationship

The household data clearly shows that except Pathankhali in Gosaba block earthen houses are common in most of the Sunderbans *(fig 7)* and usage of fuel wood for cooking is a common practice *(fig 8)*. Electricity is almost absent except Pathankhali. Even in Sagar, a prime tourist spot and an internationally famed pilgrimage, complete electrification is yet to be done. Few houses enjoy solar power though their number is insignificant. The case is almost same everywhere. Most of the houses don't even have their own latrine. So the overall socio economic condition is gloomy and impaired with any kind of development programme because of susceptibility to disaster.

Embankment types

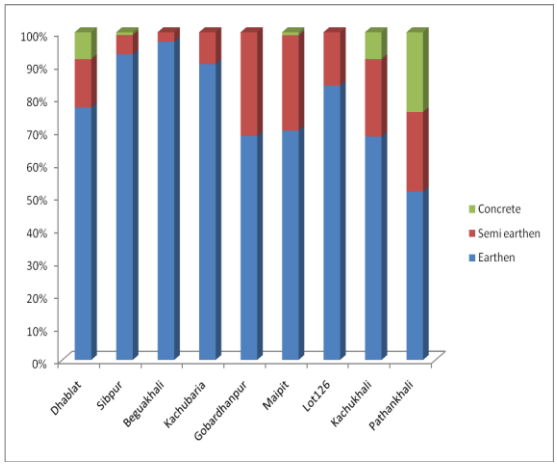


Fig7.

Fuel types

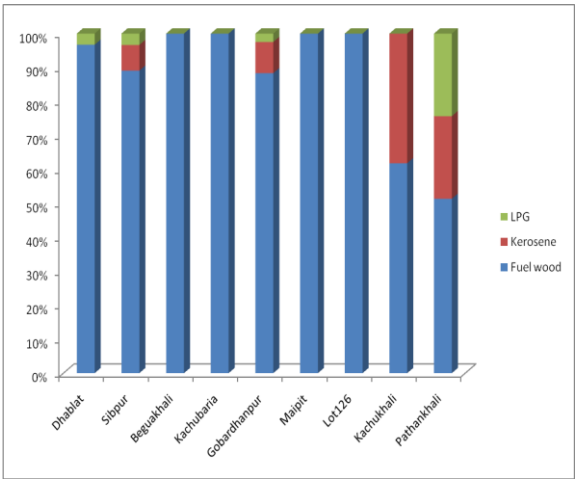
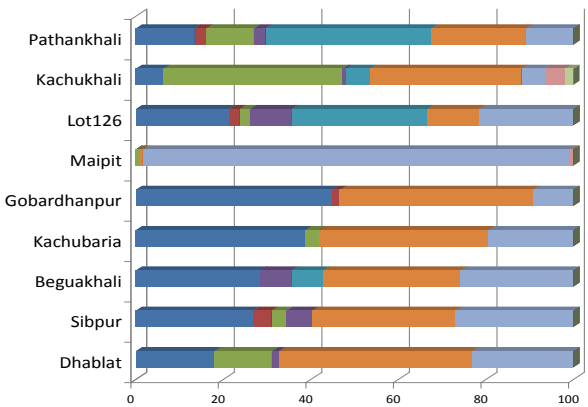


Fig8.

Source: Household survey 2011-14



Perception about embankment

Source: Household survey 2011-14 Fig: 9

From the figures given above and facts and information available through various sources it is certain that the livelihood of the inhabitants of the Sunderbans is embankment dependent. But these age old structures are not enough strong to resist against disaster because of poor maintenance. The views and opinion about maintenance of the embankments is different *(fig 9).*

Theoretically in such a disaster prone area the people who belong to economically or socially backward classes are supposed to settle down in comparatively vulnerable places and the well off classes in safer places. But in the Sunderbans the distribution of settlement depends mainly on accessibility and here most of the communications are done through waterways. Accessibility decreases as distance increases from the river. The field study reveals that the higher income group live close to the embankment *(fig 10)* and the interior higher areas are left for agriculture mainly. The pattern of distribution of population is very mixed, rather heterogeneous. No relationship can be established between annual income and distance of households from embankment for all the studied mouzas. The figure is not a representation of Maipit only rather it represents the entire Sunderbans because nowhere in this part of the district income bear any relationship with distance of households from embankment.

Income-embankment relation in Maipit

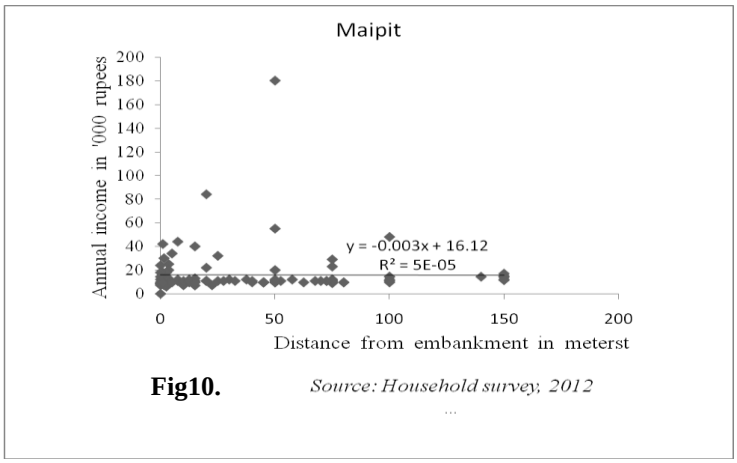
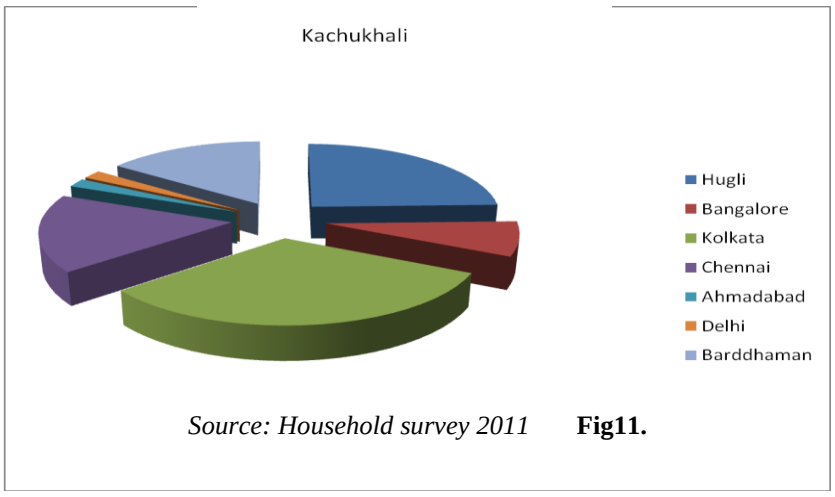


Fig10. *Source: Household survey, 2012*

The discussion on the agonizing effect of disaster on the Sunderbans would have been incomplete if the recent change in demographic pattern is left untouched. For last one decade or even few years more the region had witnessed a seasonal migration of inhabitants to adjacent districts or states for extra income during the dull season as mono cropping is practised there. This trend of emigration has aggravated many times after *'aila'* (2009) when agriculture and inland fishing confronted a challenge of stagnation for two years. Even after six years, since *'aila'* had taken place, agriculture and inland fishing have reclaimed its previous benchmark yet the villages are still left with mainly middle aged workforce and non productive population.

Migration from Kachukhali



Source: Household survey 2011 **Fig11.**

The average rate of literacy is growing in the Sunderbans. Higher education is not a challenge nowadays. There are abundant high schools and 13 colleges in the region. Accessibility has been increased because of numerous bridges and increasing length of roads and railway track. Again with advent of technology and globalization information is no longer a constraint in development and people are well aware of the outer world. They get easily attracted to the amenities available and exert a pull from the outer world. For a better livelihood and a steady income the inhabitants of the Sunderbans are migrating outside *(fig 11).* Intra district, intra state and inter state migrations are taking place all over the region. Not only the literate section is refusing their traditional occupation, even the illiterate section finds no interest in carrying out agriculture or fishing within the region because of uncertainty and lesser profit.

5. CONCLUSIONS

So the problem of depopulation in the Sunderbans was initiated because of frequent occurrence of hazards and absence of mitigation measures. It has been aggravated severely after *'aila'* and the process of emigration still continues as already mentioned. Proper maintenance and strengthening of embankment may assure better yield in agriculture and inland fish catch but the young generation are not ready to carry out their livelihood in practicing primary occupation rather they train and equip themselves and find job outside the Sunderbans. The problem starts with embankment but ends nowhere.

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