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Environmental Degradation and its Consequences on Economy: A Study on Sagar Island, West Bengal

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Abstract: The environment is the habitation of human being in complete sense. It is the prime source of shelter, locally produced food and vegetation of the people. Any sort of environmental change ultimately determines the changes of livelihood condition. Along with it, if the socio-economic conditions get changed then the socio-cultural practices and the functions of social organisation and social-institutions must get altered, which ultimately influence a lot on the daily ways of living. The ecological and surrounding environmental consequences are deeply correlated with the economic feature of the human beings of any concerned area. Therefore, its adverse nature may affect the economy and development of society in various ways. It is true that at present the world is facing a tremendous environmental crisis, because in different ways a continuous environmental degradation is happening and increasing the crisis of survival. In this concern, the coastal Sagar block of Sundarban areas in West Bengal, faces several environmental problems. Apart from environmental fluctuation or natural calamities, land erosion is another most important problem of this area. The local people are continuously losing their land and related economic resources and scopes; due to breaking of embankment sometimes sea-water causes flood in this area; further, due to reduction of the flow of fresh river water, salinity of the water has been increased in this area, which may have a serious impact on life and economy. Considering these issues, the prime attempt of this paper is to highlight the nature of impact on their economy.

INTRODUCTION

Environmental degradation causes the loss of both physical and biological life forms on the earth. Man is a part of environment in a sense that man is

dependent on natural environment in many respects. Man collects several things from the environment and also causes damage to the environment by destroying the resources for his greed. So once the

environment is damaged or degraded the man endangers his own survival also. Environment and human being, both are very much inter-related. Long back, the human beings were fully parasite on nature and even today most of the indigenous people are very much dependent on nature and environment. The modern people have developed their technology and apparently they are becoming less dependent on nature, but never could isolate themselves fully from it.

Man had created several aspects on mementos but in a number of cases those were ruined up by different natural calamities. Ultimately the changes of environment certainly influence the livelihood of human being and also the other living beings of the world. In several cases these influential activities tell upon the socio-cultural life of the concerned people. In this regard the studied area is a good example of worst affected area where both natural hazards and several global changes are becoming a part of daily existence of the studied people and they are to survive by struggling with those factors day in and day out.

Studied Area and its Environmental Situation: The study was carried out at coastal Sagar Block in Sundarban areas of South 24-Parganas district of West Bengal, India, where mainly three types of environmental problems, various types of storms, soil erosion and inundation of crop land by saline-water due to high tide were noted.

The oceanic originated cyclones heat the coastal Sagar Block four to five times a year. These violent storms were far more destructive of lives and properties than either droughts or floods (O'Malley 1914, reprinted 1998: 168). The natural environmental hazards like various cyclonic storms, tidal waves and floods seriously told upon the daily life of the people of Sagar Block in different ways such as breaking of coastal embankments, inundation of crop land by saline water, destruction of crops, erosion of farm-lands and settlements and damaging

of other properties conspicuously. Various cyclonic storms and floods were occurred in 1823, 1833, 1838, 1856, 1864, 1867, 1868, 1869 and 1871 at Sagar Island (O'Malley, 1914; Pargiter, 1934; and Mandal, 2004). In May 1833, the Sagar Island was submerged to a depth of ten feet, and the whole population of 3000-4000 souls is said to have perished (O'Malley 1914, reprinted 1998: 178). The recent most serious cyclonic storms and floods occurred at Sagar Block in 1900, 1904 and 1907, 1909, 1942, 1971, 1973, 1976, 1981, 1988, 1996, 1997 and 1998. These destroyed the crops, lives including man and cattle, houses and other properties in a great degree of this Sagar Block (Pant *et al.*, 1978 in Das, 2006; Das, 2006; Chakrabarty, 1995: 31). The latest major cyclonic storm, Aila crossed West Bengal coast near Sagar Island as well as Sundarban areas. Due to this fact the entire Sundarbans had suffered extensive damage under the impact of cyclone Aila (India Meteorological Department, 2009; and Cyclone Aila in West Bengal, <http://www.gits4u.com/wb/wb9.htm>, accessed on 17.1.12)

Further, the environmental scenario of the Sagar Island as well as the mouth of Hooghly River was changed due to both natural and several manmade reasons. Degradation of tidal creeks of this area due to human interventions was one of the most critical environmental issues of the regions. The flow of sweet water was reduced as a result the silt deposition, flood, soil erosion and the salinity of water were increased to a great extent. Moreover, the flora including various local plants, grass and different fauna as well as economy of the people got affected.

Water salinity in the rivers of the areas changes with the seasonal variation. Salinity varies from 8.6 ppt to 31 ppt from monsoon to pre and post monsoon times. It ranges between 18 and 25 ppt in the surface waters during post monsoon periods. On the contrary the salinity of open sea water of the mouth of the rivers varies between 23 and 34 ppt (Das, 2006: 26-27).

Along with these continuous uncertainties due to soil erosion at Sagar Block has increased the problems of displacement and as a result many have been forced to shift several times. In fact, a major part of this block, consisting of two major islands, Sagar and Ghoramara, was eroded and lost (in the river?). Obviously, it has some impact on human society in regards to their shelter, economy, socio-cultural and inter-personal relationship. To understand the adverse impact of environment on local economy of the people, the present research work was conducted with special reference to four villages, two located at Sagar Island and another two at Ghoramara Island. The two villages of Ghoramara represent two situations, one is highly eroded and there is a constant threat to erosion, while the other is less eroded. The inhabitants of two other villages at Sagar Island stayed at Ghoramara in the past, but as their home and land were completely eroded, they were displaced and migrated and rehabilitated at Sagar Island and two new villages were established. Thus, the studied four villages represent different situations, two totally eroded where villagers lost their home and landed property; one highly eroded and the other less eroded.

ECONOMY

Environmental degradation affects the life support systems of human being as resources become scanty. In this concern how the flora, fauna, and other different aspects of economy have been affected in the studied area are discussed below.

Effect on Flora and Fauna: Environmental degradation has a serious impact on the flora and fauna of a region. The healthy environment always directs the man properly. The extinction of plants will endanger the animal because they depend on flora of the environment. The wanton damage of flora caused by environmental degradation threatens the life of fauna also. The studied area is the part of Sundarban, situated in the Bay of Bengal was fully

covered by dense forest, mangroves and wild beasts. But later, due to wounding of forests, both of those were extricated in the area. During the study, there were several domestic plants like mango, jack-fruit, sapodilla, coconut, banana, guava, palm, jujube, date, pomegranate, tamarind, pepsin and so on; and the fauna like cow, goat, sheep, dog, cat, were mostly prevalent. The man made embankments were destroyed for several times by the disastrous natural floods and it flooded the common pasture land too. As a result, the natural outgrowth of green grasses of this area was reduced to a great extent. The over-flooded saline water also directly affected the natural growth of other plants in the studied area. As a whole, along with deforestation, major natural calamities in the form of frequent flood, destructive storm, and rapid soil erosion reduced the studied area consecutively and also eradicated a number of flora and fauna from a long time span. It is to be mentioned that in the past (1851-1855) the entire Sagar Island including Ghoramara Island was fully covered by dense forest but in 1997 it was reduced to only 1.51 per cent of the total land area (Bandyopadhyay, 1997: 53). The over-flooded saline water also gradually reduced the natural fertility of the cultivable lands through out the studied area. On the contrary, the soothing green lash became rarely observable matter in the area. As a co-related factor the physical health and natural growth of the farm animals like cow, bullock, goat, sheep etc. were very poor and several other animals could rarely be seen because the food and the food web interaction between the flora and fauna were seriously affected by the several natural disasters throughout the studied area.

It was noticed that around one-third of the families had the domestic cattle. In view of its presence among the families it was quite prominent that in comparison to settled villages, a very few number of families of the rehabilitated villages had the domestic cattle like cow, goat, sheep etc. Mainly the scarcity of fodder and lack of straw due to land

erosion, flood and salinity had made the people less interested to domesticate the cattle.

The several modes of environmental degradation like soil erosion, storm, and over-flooded saline water seriously affected the growth of natural vegetation in the studied area. On the other hand due to lack of fodder the farm animals were no more able to provide adequate animal protein like milk, egg, meat etc. to the concerned people. Lack of green vegetation, kitchen-garden and decrease of animal protein seriously affected the food and nutrition of the studied people in these islands. All these happened due to natural disasters.

Further, gradually due to rapid soil erosion almost all of those ponds/ditches got eroded. On the contrary, the river embankment got seriously damaged and due to repeated flood, most of the remaining fresh water sources, ponds/ditches were filled up with saline water. Thus, the alternation of salinity in the sweet water decreased the chance to get mostly the locally available fresh water fishes and it directly affected the food and nutrition of the concerned people as a whole.

Mouza-Village, Residential Place and House: Environment means not only flora and fauna but it also includes landmass on which life exists. So, the land degradation is also included as environmental degradation. Loss of land is also loss of flora and fauna which exist on it. In this regard at Sagar Block, mainly due to soil erosion, out of its 46 mouzas, three mouzas were completely eroded in the river and another 23 mouzas were constantly being eroded. In this connection Ghoramara mouza was the worst affected area at the Sagar Block because its three villages were completely eroded and remaining six villages were continuously being eroded and as a whole 55.01 per cent area of the mouzas was eroded.

Considering the consequences of environmental degradation, the house erosion was well observed. Around 87 per cent of the families

faced the house erosion; and the families of rehabilitated villages were the worst victims of house erosion at earlier at Ghoramara Island. Further, around 40 per cent families faced this disaster for thrice and more than that. It has been noted that the number of erosions faced by the rehabilitated villages were much more than the settled villages implying more insecurity and distress.

It was noticed that among the studied families of Ghoramara Island, nearly 15 per cent of the families did not have any own homestead land due to complete erosion of their land. Even the homestead land holding pattern of around 80 per cent of the families was quite poor and that was not more than 0.75 *kathas*. Moreover, in respect to the ownership of homestead land and amount of land, the studied people were very poor in condition.

In case of number of rooms owned by the families, in the settled villages of Ghoramara Island, around 85 per cent families had the only one roomed house each. In this concern, 136(35.70%) families were rehabilitated at main Sagar Island but those houses were very poorly constructed. Each family was given single room accommodation where the space was not enough.

Land: In rural areas, land is an important resource. So, the loss of land and top soil indicate a great loss of the flora and fauna and affects the society very much. In the studied area, the people had a very close link with land, as primarily they were agriculturists and related with other agricultural works. The present discussion regarding land of the studied families during the period of 1950 to 2000 has been stated with reference to Ghoramara Island. It was noticed that in the past, among the studied 381(100%) families, 342(89.76%) families were dependent on agriculture but at the time of this study, only 199(52.23%) families were agriculturists at Ghoramara Island.

Due to continuous soil erosion a huge amount of land was eroded and the concerned people lost

their main resource, the land. Around 89 per cent families lost a huge amount of land and it was in average 16.02 *bighas* of land per family at Ghoramara Island. Though, the land of the rehabilitated families was also eroded while they were in their early residence, Ghoramara Island. It was found that the land ownership got limited to only 193(50.66%) families whereas in the past it was 342(89.76%) families. It is noteworthy to mention that due to soil erosion the agricultural land ownership pattern was seriously affected which also hampered them in various ways.

Agriculture: Agriculture is the worst affected component of environmental degradation. The land erosion, various storms, and excessive rain cause damage of crops. Soil erosion reduced land and affected the agriculture and also the scope of related agricultural activities to a great extent and they had to struggle a lot to accumulate their daily livelihood.

Case study: Sri Panchanan Kayal (48 years) inhabitant of Khasimara village lost twenty *bighas* of land during the period of 1970-1995. His house was eroded twice and then he had only one and half *bighas* of land. Again influx of saline water in the land had ruined up the crop for last several years. Meanwhile he started to catch *hilsa* fish as an alternative source of economy but that too was affected due to non-availability of fish owing to reduction of sweet water flow. Next he moved to *meen* collection (tiger prawn seeds) and also started to work as an agricultural labour. But the scope of *meen* collection was largely shrunk and then he mainly worked as day labour. But due to non-availability of work he could hardly earn Rs. 900/- per month to maintain his family consisting of three members. Thus a person who owned more than twenty *bighas* of land became a day labourer.

All the agriculturist families at Ghoramara Island failed in crop production due to breaking up of embankment caused by tidal wave, flood, various storms, etc. Among them, crop production was

reduced due to soil erosion in case of 97.41 per cent families. The soil erosion reduced the dependency on agriculture. As land was lost due to soil erosion at Ghoramara Island, and in the rehabilitated villages at Sagar Island, the villagers hardly had any cultivable land. Moreover, owing to this recurring crop failure a famine like situation was happened. Thus the agro-based economy was severely hit by soil erosion.

Incidentally all the 199(100%) families who practiced agriculture were affected in various ways at Ghoramara Island. All of the said families lost their crop production due to flood caused by breaking of embankment and natural calamities. Further, due to soil erosion, 195(98%) families lost a large amount of agricultural land. Even in some cases the total land was eroded and as a result both the amount of agricultural land and the agricultural productions were largely reduced.

Among the 193(100%) agricultural land owner families, the ponds/ditches which were the source of water for irrigation were eroded in case of 166(86.01%) families; betel-vine cultivator families were facing a continuous problems and loss while in the past, betel-vine of 69(44.81%) families were completely ransacked by natural hazards, diseases and land erosion for several times. However, due to continuous natural hazards, the people had to face a number of constraints to pursue their agriculture. In this context, to accumulate the common minimum livelihood, among the 193(100%) agricultural land owner families, 13(6.74%) families had to keep their land under mortgage and thus, their agricultural works were hampered a lot. Ultimately the agricultural production was worst affected at Ghoramara Island due to serious land erosion.

Fishing: The studied area, the delta is situated in the mouth of the Hugli River and in the past there was abundant production of several varieties of fishes. At that time, mainly during monsoon there was a huge flow of fresh and sweet water which flowed down from several rivers. At that time along

with other marine fishes, particularly the *bilsa* came to this area for reproduction, and thus their availability was plentiful. But due to environmental changes might be due to both natural and several other man made causes, the pressure of fresh water during the rainy season was largely reduced and thus pressure of saline water got increased. Therefore, those fishes rarely came to the area for their reproduction and as a result, the fishermen were not able to catch the fishes as was possible in the past and it collectively destroyed their major fish-based economy.

The people also cultured a number of fresh water fishes in their local ponds/ditches which provided them nutritious food and strengthened their economy. But due to soil erosion most of the ponds/ditches of the people were submerged into the river which told upon the cultivation and production of sweet water local fishes. Again, due to soil erosion and environmental hazards the over-flooded saline water of the sea entered into the local fresh water sources like ponds/ditches and it resulted into obliteration of the several local sweet water fishes.

On account of shrinkage of working scope in agricultural sector the people tried to survive from the surrounding marine resources including *bilsa* fishing and later on *meen* collection. As an alternative economy, highest percentage of families (35.70%) was primarily involved in fishing. But in this regard they were facing a lot of problems because it was noticed that the boats of twenty fishing families were destroyed by various storms and tidal wave. *Hilsa* and other marine fishing were already diminished. *Meen* collection was also on the wane. So, the entire alternative economy, fishing was going to decrease for which they had to face a lot of problems to maintain their livelihood. Further, fishing scope in rehabilitated villages was very limited. Interestingly as a result of soil erosion, they were displaced and due to displacement the scope of earning through fishing got reduced to a great extent. Ultimately the

studied people earned a little from this source and somehow could maintain their livelihood as there was no other better alternative. Therefore, the important economic pursuit of the studied people, fishing was affected due to natural hazards and environmental changes for which the studied people had to face severe setback in their economic front.

Day-Labour: Continuous soil erosion resulted in gradual degradation of cultivable land and thus the produced crop from their agricultural land and related earning, that is agro-based income source including working scope as a daily wage labour in this sector was shrunk to a large extent. Due to non-availability of agricultural works only 7.76 per cent of family could depend on day-labour work in the settled villages though the situation was much better in the rehabilitated villages (44.12%), as they had the opportunity to go outside to work.

Particularly the daily-wage-labourers who were dependent on agricultural works could hardly manage their works, and for a considerable period of time, they had no work and earning.

Due to this fact, they were suffering from several problems to maintain their minimum livelihood. The environmental degradation reduced the chances of getting good wage earning scope in the studied area. Thus, if land degradation occurs in a place the possibility of getting wage related work attached to farming is reduced. So, environmental degradation has direct negative correlation with the wage earning activities.

Business: Like that of agriculture, the scope of business might be hit by environmental degradation in the area.

Case study: Anil Chandra Kayal (70years) was an early wholesaler fish trader. He had a fish trading shop at Khasimara market upto 1985. But due to erosion of Khasimara village and market and reduction of marine fish production including *bilsa*, he had to give up the business.

It was known that more than 50 families were in wholesale fishing trade at Khasimara village at Ghoramara Island. Apart from these many were also involved in several other businesses, like cloth-garments, agro-based and so on. But due to same causes they had given up their business. Due to soil erosion and environmental changes agricultural based business was reduced. The fishing business including *hilsa* and other marine fishes was popular business and economic activity of this Ghoramara Island but these were almost ruined up. During study only 23(6.04%) families were primarily engaged in several petty businesses and 25(6.56%) families had a direct and indirect involvement with it. In this context, it may be added that the businesses like tea stall, grocery, fertilizer shop, related with *meen*, cobbler, medical practitioners, etc. were mostly common among them.

Tailoring: Soil erosion, increase of salinity, flood, and various storms reduced inflow of money to the people in the studied areas. Many of the people did not get the scope of earning here. Thus, to maintain their livelihood, particularly some of the Muslims followed tailoring as their occupation. Incidentally it may be mentioned here that some of the villagers had prior connection to this job and worked outside mainly in Kolkata to earn a livelihood.

The least occupational opportunity in agriculture and related works and fishing led 14(3.67%) families primarily involved in tailoring and as a whole there were 26(6.82%) families who were both directly and indirectly associated with it

Working Involvement of the Children: The worst victims of the environmental degradation are the children of the families of the studied area as they were debarred from all opportunities. It was revealed that the children of many families (63.14%) between the age group of 5 to 14 years were compelled to do a number of works including daily household chores, fishing, tailoring and fuel collection, and sometimes they also helped in different agricultural activities when required.

The environmental degradation reduces the chances of children of the family to be engaged in education, rejoice and merriment. Many of them had no proper shelter and they were immensely absorbed in poverty. Even in many cases their poor parents could not provide them proper dress, sufficient food and arranged proper education for them. So, the childhood of the children was lost. They had to remain in starvation most of the times and hence they had no alternative than to be child worker.

Income and Indebtedness: Owing to loss of these economic resources the people mostly could not get the scope of work and hence they failed to earn their required livelihood. The family members gave their best efforts to/on their concerned economic pursuits to earn more. But despite of all the efforts, their monthly income was not enough.

Case study: Gita Rani Das (37 years), a widow had a five member's family and was residing at Jibantala village. Their entire seven *bighas* of land were eroded and houses were eroded for twice in the past. Her husband, Khokan Das got enmeshed in the debt of Rs. 22000/- of which Rs. 12000/- was for grocery. But he died suffering a heart failure in 2001 at a quite early age of 43 years. According to Gita Rani, due to overburden of loan he suffered such heart stroke and died at such an age. Gita Rani again said that they could earn by fishing and other sources when they were at Ghoramara Island. But here at Jibantala village it was very difficult to earn more than Rs. 1200/- per month by three heads including herself and two sons, Sankar (20years) and Uttam (16 years). They were under severe economic pressure as with this poor income they had to face a lot of problems to maintain their minimum livelihood, then how they would repay the loan.

In spite of hard struggle of the studied people, per head average monthly income was Rs. 357.38. In this concern, the average daily income of an individual was Rs. 14.01/- in settled villages whereas it was only Rs. 7.83/- in rehabilitated villages. As a

consequence of poor income they had no other alternatives than to face utter hardship to manage common minimum livelihood. Ultimately it forced the concerned people to get enmeshed in the web of loan in various ways.

It was observed that around 63 per cent families were compelled to be indebted. The amount of loans was varied from Rs. 700/- to Rs. 25000/-. It helped them to tentatively redress their economic crisis and occupational requisites. Loan taken by the people was the utmost probable alternative for the studied people to cope up with the disparaging effect of environmental degradation to provide a minimum backbone for the almost ruined up economy and to operate the minimum functions of the lives as well as social institutions in spite of their all round disastrous circumstances.

Generation wise Occupation: Environmental degradation has direct bearing on the occupational shift. Due to environmental changes people try to adopt the occupation that is suited to the changed environment. In the studied area land degradation and soil erosion led many people to fishing in the river and sea, and many other works in the locality and outside also as their land was submerged. Due to storm and flood in this area the occupations related to agriculture got diminished to a large extent. So the environmental degradation played a vital role on the economic life of the people.

Considering the occupational involvement of ego's grandfather, around 90 per cent were involved in agriculture and very few were day labourer (9.45%); while the consequences of land erosion started to exert its devastating effect which reduced the agricultural involvement in the generation of ego's father to around 80 per cent and proliferated the economic engagements mainly in fishing and some other occupations. The effect of environmental degradation in the ego's generation implied a massive phenomenon which reduced the agricultural occupation to a great extent (24.67% only) while one-

third (35.70%) were involved in fishing, and increased the involvement in labour work (20.73%) and so on.

GENERAL OBSERVATION

The studied people and mainly the cultivators were exposed due to excessive precipitation, natural hazards as well as the environmental degradation resulting in soil erosion, prolonged inundations and the consequent destruction of the paddy seedlings. In the recent past due to influx of saline water caused by breaking of embankments the paddy and other green vegetables were mostly being destroyed in every year. Again due to same the production of grass as well as fodder got reduced which caused lesser number of domestic cattle.

The economic uncertainties and insecurities of so-called land erosion peoples were the driving force in their shifting to other occupations and they also move in other places for settlement. Many of the studied people for their own sustenance were forced to switch over from agriculture to several other economic pursuits like *meen* collection, fishing and whatsoever with easy access to them. This indicates their visibility on the same economic plane. So many problems were raised there such as degradation of agricultural land and crop production, destruction of houses, ponds/ditches, paths and roads, economic resources, various plants and so on. Complexities regarding rehabilitation and the number of land less people were increased. As a result, uncertainty, insecurity and serious economic constraints were being augmented.

It was observed that the overall consequence of environmental degradation led to a severe occupational change in the three generations. Where environmental hazards generated economic insecurity more in the generation of ego's and ultimately their daily livelihood was under absolute constraints and hardship. The struggle for survival and instability of income sources forced the people to get involved in different modes of occupations.

Owing to the consequences of environmental degradation, the traditional economic stability was worstly hampered and as a result many of the families had to adopt other jobs like fishing, tailoring etc. rather than traditional agriculture. In this context the studied people were being faced a serious challenge and every one of them was trying hard to earn from other sources rather than agriculture.

Environmental unrest at the island of Ghoramara and Sagar is very crucial as it very often leads to massive destruction of homes, properties and lives. The studied people tried to stick to the traditional occupation but environment compelled them to adopt new economic activities. Thus, the environment has tremendous effect on the acceptance of new economic pursuits.

Owing to loss of these economic resources they failed to earn their required livelihood. In spite of their hard struggle, their monthly income was very poor. As a consequence of poor income they had no other alternatives than to face utter hardship to manage common minimum livelihood. Ultimately it forced them to get enmeshed in the web of indebtedness in various ways. It helped them to tentatively redress their economic crisis and occupational requisites. Loan taken by the people was the utmost probable alternative for the studied people to cope up with the disparaging effect of environmental degradation to provide a minimum backbone for the almost ruined up economy and to operate the minimum functions of the lives as well as social institutions in spite of their all round disastrous circumstances.

Therefore people were always at the mercy of nature. Again people's struggle against the nature is a fact but it also can be said that people depended on it as well to get their daily requirement to some extent from the surrounding nature.

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