

CHAPTER SIX

IMPACTS OF CYCLONES

6.0. INTRODUCTION

The nature of cyclone hazards in the West Bengal coast may not be an integral part of the thesis, but it requires an appreciation as an introduction to the study on the impacts of cyclones on different sectors of the economy (in this case specially fishing and tourism). To that end, this chapter is designed to examine the types of impacts and their protruding effects on space and time by reconstructing the cyclones already occurred here. The questions first to be addressed are what we mean by the term ‘impact’ and what we understand by ‘impacts of cyclones’.

6.1 MEANING OF IMPACT

Impact refers to those effects which are observed by certain characteristics that undergo a detectable change registered on some organic, inorganic or human environment partaken by the phenomenal activities of living or non-living agencies of the natural world including man. Impacts may be directed in both ways either from the natural environment to the social one or the reverse. Since we are concerned with human beings, the final impacts are to be traced on human economy, society and culture.

6.2 MEANING OF ‘IMPACTS OF CYCLONES’

The term impact^S of cyclones refers ultimately to the effects on the life of the human being affⁱected by the phenomena. The resident community on the coast who suffers from the high speed wind, rainfall or storm surges during the cyclones receive the final impacts by a number of alterations in the physical environment acting as the media through which the social and economic effects percolate. The primary impacts of cyclones are registered mainly upon

the physical environment (implying both the natural and culturally built up) in which the climatic mechanism brings about sudden changes many of which may be only temporal and a few may be relatively lasting.

6.3. TYPES OF IMPACTS

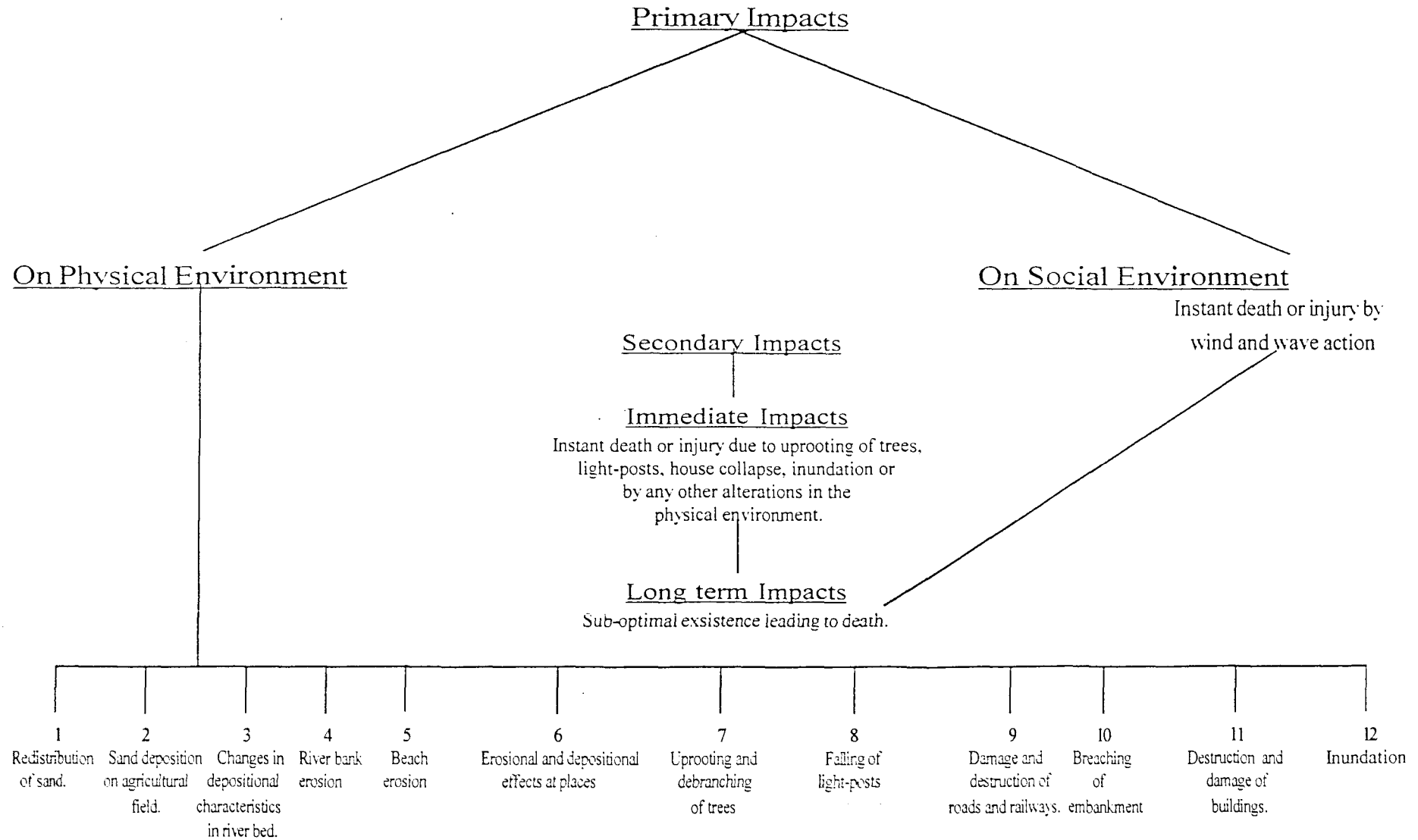
Impacts of cyclones may be classified first into two – primary and secondary which may occur both on the physical and social environment, though the extent of primary impacts on the latter is very little. Only loss of human life due to the inflow of water or high speed wind is considered as the direct impacts of cyclones on social environment. Alterations in the physical or in the social environment directly by the cyclone parameters are to be considered as the primary impacts as sand blowing by the high velocity wind, breaching of embankment by storm surges or collapse of trees and light posts by wind or storm surges etc. whereas the secondary alterations transferred and transformed from the primary one are regarded as the secondary impacts whatever may be the extent of time and spatial spread. Once the physical changes are registered in the society, social processes set in motion causing further deleterious impacts on the society concerned. Therefore, both the primary and secondary impacts may have a short-term effect experienced immediately after cyclones and a long-term effect also undergone through long-drawn processes in the social system. A model is given on the types of primary and secondary as well as the immediate and long-term effects expected to occur in the West Bengal coast following cyclones. It should be kept in mind in connection with this that other parts of the world may go through various other types of inflictions keeping pace with the characteristic nature of physical and social environment (Fig. No. 6.1).

6.4 IMPACTS IN DETAIL

To elaborate the sketchy model, the details of some important impacts are presented in the following paragraphs with examples from our study area.

Fig. No. 6.1

Primary and secondary impacts of cyclones on physical and social environment



6.4.1 Sand blowing

If high wind velocity is not preceded by rainfall, the dunal sand on the beach above the high tide level move with the direction of the wind. Sometimes such sand spreads over the agricultural field by a normal coastal wind as are seen at Bakkhali in South Twenty Four Parganas. But the extent of sand accumulation is invariably high during the cyclones. This not only reduces the fertility of soil, but may turn it unproductive for a considerable period. The fact may be tagged in connection with the problem of sand accumulation that this is not restricted only at the sea fronts but the catchment areas of the east flowing rivers in the western West Bengal coming from the Chhotonagpur hills in the west also suffer from the same problem though the latter differ in the source of sand which is brought by the rivers due to heavy shower at their source regions. Huge amounts of sand accumulated in the river basins of the Damodar and Ajoy during the September cyclone in 1978 (originated in land) and also in the recent September flood in the year 2000.

6.4.2 Changes in channel characteristics

During a cyclone, channel characteristics may change by the sudden inflow of a large volume of water with a high velocity. Erosional processes are conspicuous during the tidal surge due to the accompanied forces. As a consequence, the point bars of the river may be completely detached from the banks. The bases of the embankments may be scoured leading to collapse and breach. Immediately the inland areas are inundated followed by a prolonged impact.

Within tidal reaches, the inflow of water is followed by the ebb tide when bed scouring sets in leading to redistribution of the sand-bars and shoals. This sometimes creates navigational problems specially for the movement of large ships from the Calcutta port in the river Hugli. The 1864 cyclone caused a navigational disturbance at Khejuri (fig. no. 2.2) in Medinipur due to a complex change in channel characteristics. The port of Khejuri which developed as subsidiary to the Calcutta port and thereby as a first entry point of news and information from Europe, was flourishing at the mid-19th century

with facilities of post and telegraph systems and also as a township of the Europeans. It sustained a sudden and forced abandonment of its port facilities along with other developmental works due to lowering of the depth at the point of harbour after the cyclone of 1864 (Reaks, 1908, pp. 245-52; Karan, 1927, pp. 17,28 and Basu & Dhara, 1993).

6.4.3 Inundation

Storm surge and incessant cyclonic rainfall are the two main sources of inundation in the West Bengal coast. Storm surge usually gets entry through the rivers and the rivers are also in spate due to torrential rains. The depressed inland areas like Mayna, Ghatal, Daspur, Durgachati of Medinipur may be inundated by cyclonic rains only. But the situation worsens invariably if the water level in the rivers is raised beyond the capacity of the channel breaching the embankment by water pressure as experienced during the 1978 cyclone at many places. In such circumstances, inundation occurs through backwash of the rivers as from the Hugli to the Damodar and then to the Kunur i.e. pushing water from the main river to its tributaries and from the tributaries to the sub-tributaries repeating the same process.

Inundation by storm surge is an infrequent phenomenon in West Bengal coast but is not rare. The South Twenty Four Parganas coast is affected by storm surges more than the Medinipur coast. Inundation by storm surges in the October cyclones of 1737 (Tannehill, 1945, p. 32; Nalivkin, 1982, pp. 68-71) 1864 (Gastrell and Blanford, 1866; Hunter, 1875, 1876; O'Malley, 1911) and 1942 (Amrita Bazar Patrika, 1942 Oct. 21 p. 1; Times of India, 1942, Oct. 29, p. 5; Sen, A, 1986, p. 52) is remarkable in the cyclone history of West Bengal. Inundation by storm surge induces salinity problem in the agricultural fields reducing the production or making the cropland barren for years to come. The Bengal (before independence) peasantry had to encounter such a situation after the devastating cyclone of 1864 (Hunter, 1875, 1876).

In severe cyclones as occurred in October 1996 storm surges are generally restricted at the sea-side area. In plate no. 6.1 Digba is shown with inundated beach due to the occurrence of this cyclone.

Breaching of island is also a rare but a factual event in our area. In 1864 cyclone, the island of Sagar was parted into two at its northern part giving rise to a separate island of Ghoramara (Gastrell & Blanford, 1866) (fig. no. 2.3). At present Ghoramara is rapidly being reduced of its area (Basu & Dhara, 1995). Bandopadhyay, on the basis of data obtained from River Survey Department, has shown that the island has been reduced from 8.68 sq. km. in the period of 1938 – 1942 as 87.21% of its area to only 5.41 sq. km. as 25.23% by regular tidal action (Bandopadhyay, 2000, pp.103-15). Two other small neighbouring islands have already been diluviated (fig. no. 2.3). Plates nos. 6.2 and 6.3 show beach erosion due to cyclones and regular tidal action.

It is not known what would have been the fate of the area, had it not been split in the 1864 cyclone. But we must not forget in this connection how the settlement operation in the 19th century in Sagar island suffered time and again by repeated cyclone disasters with accompanied storm surges in the years of 1833, 1842, Oct. 1848, June 1852 and lastly in October 1864 splitting the island as described earlier (Ascoli, 1921 pp. 66 – 67; Pargiter, 1934 pp.116- 18).

6.4.4 Collapse of trees and buildings

Uprooting of trees may cause death and injury of man and cattle. It may also snap electric wire disturbing the supply of electricity. Telephone connections may also be disturbed by the snapping of telephone wire or collapse of telephone posts. All of these are the loss of assets. The economy is also affected due to the loss of trees and cattle.

People lose their belongings and valuable assets due to the damage of the private buildings. Valuable documents are lost if the public buildings collapse or are damaged. If the educational institutions are damaged, the academic



(Plate No. 6.1 **STORM SURGE AT OLD DIGHA**)

pursuit is hampered for the time being. And if the school buildings are used as the cyclone-shelters or disaster-shelters, as are usually done in West Bengal coast, the educational system and thereby the process of human resource development are affected for a short time. Uprooting of trees, electric posts, telegraph posts etc. may also create transport problems as shown in fig. no. 6.2.

6.4.5. Collapse of light-posts

First it disrupts the supply of electricity. It may cause an instantaneous death if it falls upon man. An inevitable consequence of the disruption in electric-supply is the effects on the industrial production – both large and small. Supply of drinking water is also in crisis when it is dependent upon pumping system run by electricity. The town and tourist spots in the coastal area are mainly affected by this. The hoteliers in Digha are forced to keep alternate system of electric supply with the help of individual generators due to usual short supply of electricity and also disruption in electricity due to frequent cyclone events in the monsoon and non-monsoon seasons to arrange for the minimum necessities for the tourists. In the cyclone year of 1988, most of the hotels were in darkness for consecutive three days at least.

6.4.6. Disruption in transport and communication

Disruption in transport and communication is caused as secondary impacts of collapse of trees and buildings, collapse of light posts and telephone posts and snapping of telephone wires, but mainly by large scale inundation in which the transport lines of roads and railways not only remain under water, but are highly damaged rendering the affected zones detached from the surroundings for a considerable period. Not only the rural interiors, that in usual circumstances retain a distance from the nearby administrative sectors of Block, Police Station or District town, not in terms of physical distance, but on account of its communication systems. But the main administrative centres also sometimes suffer from isolation as in October 1999 in case of the Capital city of Bhubaneswar in Orissa remaining detached for a few days at the advent

of cyclonic situation not to speak of the other surrounding areas of the state affected by the cyclone. Radio, telephone or wireless system is the only alternative in such situation. In recent years, however, the state administrative sectors of District Headquarters, Sub divisions or Police Stations at the lower level have been equipped with radio telephones as a usual process of development.

Situation in the remote villages is indescribable. Stock of food or clothing are usually washed away by inundation. The poor people start starving without getting food as relief and only try to maintain an inhuman life sometimes on trees, sometimes on the roofs of mud houses or brick buildings. The low coastal plains of West Bengal are readily shaped as a big river or a vast sheet of water and the usually ill-communited ill-fated villages in the marshy areas of Medinipur and Sundarban estuary remain far beyond the reach of the government relief and sometimes also of the relief served by the voluntary agencies.

It takes time to bring the regular economic and functional activities back into normalcy. But the reality is that the normalcy or the stability is gone for ever sometimes for generations, in specific cases of discriminating and depriving socio-economic situation specially at the lower level of the vertically hierarchical structure of the society. Below, a model is produced showing the most expected steps of transfer of inflictions, first from the physical to social environment and then different crises in the social situation (fig. no. 6.2).

As the fig. no. 6.2 shows, almost all types of primary inflictions initiated from different points ultimately lead towards a similar goal of a sub-human living system. Another figure is produced showing different types of inflictions with onset time and probable duration of effects (fig no 6.3).

PLATES



1

62 **CHANGES IN BEACH CHARACTERISTICS
AFTER A CYCLONE, DIGHA.**

*What is
the change?*



2

6.2 **DEVASTATION AFTER A CYCLONE AT
BEGUAKHALI, SAGAR ISLAND.**



1

6.3 BEACH EROSION IN TIDAL ACTION, SITARAMPUR



2.

6.4.7 Processes of sustaining impacts

Initial transformation in the physical environment induces a sudden break in the economic sectors as already explicated by the case of Khejuri in the tertiary service of port activities. But the society at large is affected by the economic instability set in the primary sectors of agriculture and fishing. Immediately the people of 'have-nots' fall in the debt-trap in agricultural sector. Inflections may start from two points. On one hand, it may be the loss in the quality and quantity of raw material or capital as the deterioration of land quality in agricultural sector and results in loss in produce and loss of seed for future production. On the other hand, it is the loss of life or deteriorated health condition of the earning member of the family so as to fall in the vicious circle of poverty started with low income level and progressing towards low education level and limited scope of income thereby leading towards a sub-optimal living condition. Short term migration may also occur.

Ill-health is more precarious than the loss of life. The family has to accept the burden of medical expenditure for the main earning member of the family in addition to bearing the cost of minimum dietary system of the family as a whole by the earnings of the female and minors at low wage rate and at the expense of mal-nutrition of the younger generations at the first days of their lives, low education level or absolute illiteracy. Inevitable consequence is to fall in a debt-trap that induces some other automatic chain of reactions of continuous economic pressure with a low social status evolving continuous social pressure from the upper layers of the society. Thus they inherit from a low-grade social environment a low mental strength to overcome the crisis specially in absence of any other institutional help. Notwithstanding, fishing as a primary economic group is liable to be affected more than the tourism in the tertiary sector.

6.4.8 Impacts of cyclones on fishing

Fishermen engaged in sea-fishing are the largely affected economic group exposed to cyclone hazard. They risk their lives at the rise of oceanic waves in

Fig. No. 6.3
Showing impacts of cyclones: Onset Time and Duration.

<u>Types of alteration</u>	<u>Causes</u>	<u>Types of effects</u>	<u>Duration of Effects</u>				
			Instant	Latent	Very short term	Short term	Long term
Sand Blowing	High speed wind before the start of rain	i) Crop lands near the sea filled with sands ii) Difficult for beach-strolling for the tourists in sea-resorts iii) Blockage of the beach-front of sea-side hotels	---	---	---	---	---
Collapse of trees, Light-posts, telephone and telegraph posts	High speed wind, storm surge.	i) Disruption in transport and communication ii) Disruption in electric supply iii) Loss of property causing loss of income iv) Loss of life	---	---	---	---	---
Damage and destruction of buildings	Winds, rainfall and storm surges	i) Loss of property, loss of assets ii) Loss of records(Government offices) iii) Disruption in academic session in educational institution	---	---	---	---	---
Breaching of embankments	Storm surges, Incessant rainfall	i) Inundation ii) Salinity problem in agricultural sector iii) Damage and destruction of roads and railways, causing transport problems iv) Damage and destruction of buildings	---	---	---	---	---
Changes in channel characteristics	Inflow of storm surge with voluminous water and the reverse-flow in ebb tide	i) Re-arrangement of shoals and bars ii) Detachment of point-bar, bed scouring at the lower level of embankment, causing breaching of embankment iii) Navigational disturbance iv) Breaching of islands	---	---	---	---	---
Capsize of fishing vehicle	High-speed wind, Ocean-waves	i) Loss of trawler ii) Death of fishermen	---	---	---	---	---
Damage of fishing vehicle	High-speed wind, Storm -surges	i) Monetary loss ii) Injury to fisherman	---	---	---	---	---

cyclonic situation. Also loss of fishing boat, net and loss of catch are inevitable parts in sea-fishing. Above all, loss of labour days induces economic uncertainty and insecurity. Effects on health and life may ruin them in a long term. All of these will be discussed in detail in the relevant chapter.

6.4.9 Impacts of cyclones on tourism

Tourism, while developed in a cyclonic coast is likely to bear risks for both the tourists and non-tourist groups. Tourists who are present in the crisis situation may have to endure a fatal consequence as happened to three persons in Digha in the cyclone of April, 1995 (The Statesman, April 6, p. 3). They not only lose the cost of entertainment already spent, but are also likely to be affected by injury or illness to health, loss of holiday and enjoying mood and also may be stricken by fear-psychosis.

- i) Overall negative attitude of the tourists towards cyclonic situation and affected by other effects on physical environment, the non-tourist people connected with tourism are affected economically. We shall examine mainly the negative impacts of cyclones on both sea-fishing and beach-tourism activities in West Bengal in the following two chapters. *