EAST PAKISTAN

Cyclone

. . . The worst of the 20th century. It happened November 12-13, 1970. Along with a tidal surge, the storm ravaged the coastal regions and islands of East Bengal. Estimated dead 300,000. Total persons affected: 3,648,000.

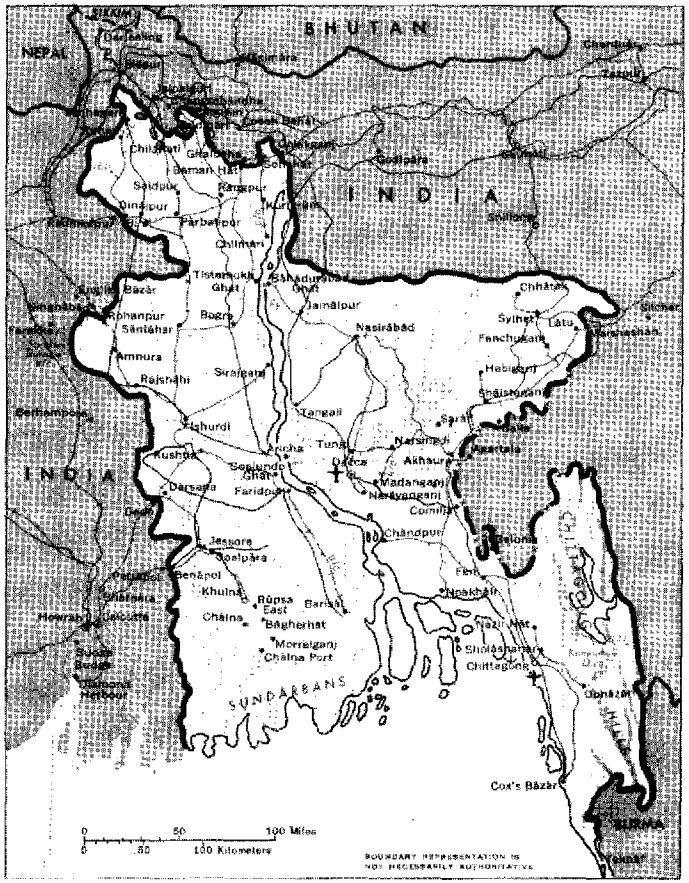
Some other consequences: 235,000 houses destroyed, 100,000 damaged; 470,000 livestock killed; 9,000 fishing boats lost; 400,000 metric tons rice lost. Total estimated dollar damages: $86.4 million.

Value of U. S. Assistance:	**$18,333,899**
Value of Other Nations Assistance:	**30,383,664**
	$48,717,563

DETAILS:

The tragic November cyclone followed closely a severe flood disaster in East Pakistan during the summer and fall of 1970. The storm was first reported at 9:00 a.m. on November 9th. Initially designated a low pressure area located 800 miles southwest of Chittagong, it moved in a northwesterly direction. In four hours it had developed into a cyclone with wind speeds up to 54 miles per hour. It then proceeded in a northeasterly direction, increasing speed as it cut up into the Bay of Bengal. By the early morning of November 12, the cyclone had crossed the Khulna coast, continued to intensify, and by 6:00 p.m. was centered near Chittagong. Wind velocity eventually reached 150 mph. From this time through the early morning hours of November 13, high winds battered the islands and coastal areas.

The eye of the storm passed between Bargara and Khepupara, south of Patuakhali and Maijdi. The offshore islands from the



mouth of the Haringhata to the estuary of the Meghna were in the path of the right half of the cyclone—potentially the most dangerous part.

The whole of Hatia and Bhola Islands and sections of Patuakhali felt the full force of the winds and were inundated by a tidal bore. In addition, all of East Pakistan bounded by the Indian borders on the west and in the coastal belts to the east and the line through Noliam, Nala, Koakali, Gurnadi, Chandpur and Comilla were engulfed by the storm.

Because it coincided with the usual spring tide (a predicted high water mark of 9.9 feet at Hiron point), the tidal surge that accompanied the cyclone was abnormally high, reaching 20 to 25 feet.

All the small islands of the Ganges Delta which were submerged by the tidal surge made their reappearance after the tides had subsided. As the storm moved on, the water rushed out of the area carrying with it houses, boats, human bodies and animal carcasses. It left behind 1,100,000 acres of destroyed cultivated land. Some regions were less affected because of the presence of man-made embankments; those areas without protection lost everything.

An official survey by the Government of Pakistan indicated there had been 16 cyclones, tidal bores and floods in the past decade—conclusive evidence of the recurring nature of these kinds of disasters in the eastern region of the country. The table below lists the most destructive ones that have occurred since 1960.

The November 1970 cyclone tore through an estimated 3,900 square miles of territory in the dead of the night, catching most of the almost three and one-half million inhabitants who were affected by surprise. The system which had been established to warn the population of a coming storm did not work. The reason was that the East Pakistan Government officials, despite the issuance of a "great danger" signal, had described the cyclone in no more frightening terms than they had a lesser storm on October 23 that took 300 lives.

Date	Location	Wind Speed (mph)	Height Tidal Surge (Ft.)*	Number of Square Miles Affected	Number of Square Miles of Crop Damage	Number of People Killed	Monetary Loss (in millions $)
Oct. 1960	Chittagong	120	10-15	4,157	1,130	8,150	9.4
May 1961	Meghna Estuary	90	10	3,097	306	11,200	11.9
May 1963	Chittagong	125	10-15	2,700	960	11,500	46.5
May 1965	Patuakhali Khulna Noakhali	100+	12	7,032	320	24,200+	57.7
Oct. 1966	Sandwip	90	14	2,727	737	850	22.4

* Estimated height of surge above normal tide water level.

In the November 18, 1970 edition of the New York *Times*, a resident of Manpura described the suddenness with which the storm came upon the island:

> *"At midnight we heard a great roar growing louder from the southeast. I looked out. It was pitch black, but in the distance I could see a glow. The glow got nearer and bigger and then I realized it was the crest of a huge wave."*

And then destruction swept over the area. In the worst hit sections—Hatia, Bhola and Manpura—from 70 to 75 percent of the residents drowned. Over and above this an undetermined number of seasonal workers died. As shown by a graphic eyewitness account of the *Time* Magazine reporter Ghulum Malik, the devastation was so great that the toal number of people dead and the amount of property damage may never be known precisely.

> *"I could not walk 200 yards without passing heaps of bloated bodies. For miles, animal carcasses littered the landscape. The stench was appalling—the sight of parents hovering over their dead children staggering."*

Casualties and property destruction on the small island of Manpura, measuring 25 square miles, reached almost 100 percent. Prior to the disaster Manpura's population was 26,000. Afterwards it was found that three-fourths of the entire population, almost 20,000 people, had perished. Of the 4,500

dwellings existing on the island before November 13, four were left standing after the tide had withdrawn. Only a few livestock survived.

Extremely high losses occurred also on the large island of Bhola and in nearby areas of the Barisal district. Out of a population of 565,000, 134,234 were killed. Hatia Island and the coastal regions of Patuakhali and Noakhali districts were severly affected too.

Backwash of the tidal wave erodes the rich topsoil of Bhola Island in the Delta

Over all, almost 90 percent of the homes were demolished, leaving hundreds of thousands without shelter. About 75 percent of the cattle, sheep and fowl were lost, and an estimated 1700 square miles of crops, mostly rice, were destroyed or sustained heavy damage from the water. In the towns and villages struck by the full force of the wind and water, the ability to replace damaged crops quickly was impeded by the harmful effects of the salt water on the arable land. New seed could not be planted with any guarantee of success until fresh rain water had cleared the remaining salt from the soil.

Besides homes, crops, and livestock, the fishing industry was left in ruins. Thousands of boats and nets were destroyed. No segment of the economy escaped the devastating effects of the cyclone. For days the shocking casualty figures were not known in Dacca—only 104 miles away—because so many boats, the most common means of communication between the islands and the mainland, had been sunk or badly damaged.

Disruption of communication was complete. Telephone and telegraph lines could not withstand the fury of the storm and no longer connected the cyclone region to the East Pakistan capital city, Dacca. The extent of the disaster, therefore, could not be quickly and accurately known by officials. This was evident by the initially low estimate by the Government of Pakistan on the number of people killed. Bridges were swept away by the combined strength of the tidal bore and the high winds. Whatever roads previously existed were washed out; rail lines were torn up. Transportation, along with communications, was thereby halted. The sole means of reaching survivors in the more remote districts was by helicopter.

(A survey of 9 thanas in 3 districts resulted in the following findings on loss of lives and housing damage. They do not represent the entire region affected by the cyclone—only selected areas. It should be noted that the mortality figure is a minimal estimate since only families with surviving members could be counted accurately. Those that lost all members, as well as migrants, are not included.)

District	Thana	Pre-cyclone Population	Cyclone Deaths — Percent	Deaths — Number	Houses Destroyed Percent
Noakhali	Ramgati	210,040	10 2	22,225	62.6
	Sudharam	34,626	17 3	5,990	87 8
	Hatia	218,657	7.7	16,764	89 3
Barisal	Tajumuddin	104,457	45 5	47,559	97.9
(Including	Lalmohan	306,930	11 3	34,560	90 3
Bhola)	Char Fasson	153,725	32 0	49,115	92.5
Patuakhali	Galachipa	318,813	13 8	43,996	86 1
	Kalapara	87,906	9 3	8,190	84.4
	Amtali	40,983	4 6	1,885	94 3
Total		1,476,137	15.6	230,289	87 0

Living Conditions in the Cyclone Area

The cyclone struck an area of islands and peninsulas in East Pakistan that are no more than 20 feet above sea level These lands are extremely fertile. The were formed by the pulverized rock of the Himalayan glaciers and the silt of the Indian plains that together flow down the Ganges and Brahmaputra rivers. Rice is the chief product, and, although there are several harvests each year, the amount produced is barely sufficient to feed the population This lack of food is compounded by the use of outmoded methods and tools The Ganges Delta is one of the poorest areas in the world with a per capita income of only $63

No industrialization has yet taken place. There are no modern conveniences—electricity, well-trained medical personnel and sanitation facilities are almost non-existent on these islands Thatch, rags and bamboo are used by the people in building shelter. The poor construction makes the average dwelling extremely vulnerable to storms of any kind.

Disease, along with the likelihood of cyclones and floods, constantly threatens the lives of the inhabitants. Hundreds of children die annually as a result of typhoid, smallpox, and tuberculosis Cholera takes thousands of lives each year The life expectancy in the area is exceedingly low—about 40 years.

All of East Pakistan has a land area of only 55,126 square miles but its population is about 78 million The potential destruction of the tropical cyclones that tear through this region every year is magnified by these masses of people. The population density of East Pakistan is 922 persons per square mile —the highest in the world. Over-population continues to hamper development plans. Even though agricultural production rises by 2 to 3 percent a year, the population growth exceeds 3 percent.

Effectiveness of Pre-Cyclone Disaster Prevention Projects

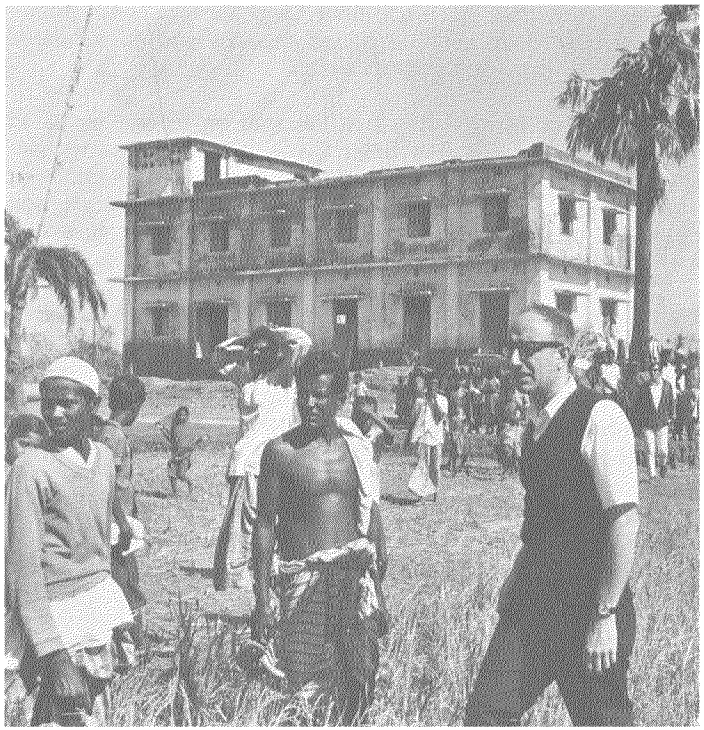
Warning System

With the help of the League of Red Cross Societies, the United States, and Australia East Pakistan had built an extensive communications system connecting the outlying areas with the urban centers. Known as the cyclone warning system, it was designed to alert residents to oncoming storms One of the great tragedies of the November 1970 cyclone was the breakdown of this warning system As a result not everyone who might have been able to reach a cyclone shelter even tried to. The traditional warning system, which involved a numbering system of increasing danger levels normally used by mariners, had been abandoned and replaced with a simplified system which incorporated "Distant Hurricane Danger" and "Hurricane Danger Great" warnings. These were considered to be more appropriate for use by the general public, but the people had apparently been confused because of the change. Also, in some areas with no shelters available and no high ground to which to flee, the warning would have been in vain.

In the months following the cyclone, the League of Red Cross Societies has had representatives in East Pakistan working towards reactivation of the warning system. This has been interrupted by the civil strife and the conflict between India and Pakistan that occurred in December of 1971. The League hopes to have an effective warning system established before the April/May cyclone season in 1972.

Coastal Embankments

Over the past ten years the Government of Pakistan, with financial and technical support from the U.S Agency for International Development, constructed some 2,000 miles of coastal embankments in East Pakistan. The embankments were designed primarily to expand the critically short area of tillable land in one of the most densely populated areas of the earth. In areas that had been protected by them for three years or more, there was a substantial increase in agricultural output. But the embankments also served as protection against most cyclonic storms, high seas and the annual river flooding. These earth works rise 15 to 30 feet above the virtually sea-level land. They were not engineered for total protection as this would be impractical in both cost and availability of materials. While some embankments were wiped out or breached as a result of the November cyclone, there was evidence that others had held and had prevented an even greater disaster. Areas that had no such protection were among those that suffered the most storm damage.



AID Deputy Administrator makes an on-the-spot survey of damage and relief efforts in the Delta. In the background an AID-financed community shelter building

Cyclone Shelters

In Barisal, one of the hardest hit districts, many lives were reportedly saved and relief work speeded up because of a cyclone shelter project that had been started after the disastrous cyclone of May 1965. Under a US A.I.D assisted project, the Pakistan Government constructed 220 steel reinforced brick and concrete buildings to withstand high winds and to be used to shelter nearby residents during storms and to serve as disaster relief centers afterwards.

It was in such a building that a World Bank survey team took shelter at the time of the storm There they remained safe from the effects of the wind and tidal surge, as did many of the residents in the area. The U.S. Mission reported that in general these shelters stood up very well

Cyclone-Resistant Housing

Approximately 800 simple compressed-block houses were built in Chittagong under a Government of Pakistan/CARE/USAID project. It was reported that they withstood heavy flood conditions in the summer and fall of 1970 and they also survived the cyclone.