Hurricanes 3 Essay, Research Paper

Hurricanes

A natural hazard is when extreme events which cause great loss of life and or property and create severe disruption to human lives, such as a hurricane. Editor Philip Whitefield brings up an important point in Our Mysterious Planet when he comments;

At a time when we know how to aim a space probe directly at Mars and trigger the gigantic forces of nuclear power, we are still at the mercy of hurricanes and volcanoes.

It seems peculiar how we can be at such an advanced stage technologically yet we are unable to completely stop a natural hazard from causing loss of life and damage to existing constructed resources and infrastructures.

Hurricane Gilbert, September 1998 was described by meteorologists at the US National Center in Miami, as the most intense western-hemisphere tropical cyclone on record. Large areas of Jamaica were devastated and the country s Prime Minister, Edward Seaga, pronounce it the worst natural disaster ever to strike his country. Greatest loss of life however, occurred in Mexico where Gilbert hit twice, first of all traversing the Yucatan Peninsula and two days later making landfall some 150 km south of the border with the USA, finally dissipating near the city of Monterrey.

During its most intense phase at the western end of the Caribbean Sea, Gilbert was estimated to have central pressure of 885mbar, and maximum sustained winds in its circulation over 150kt (knots) with highest gusts in excess of 175 kt. The central pressure outrivalled the 899 mbar of the Florida Keys hurricane of 1935. Gilbert, at that stage an un-named tropical depression with maximum sustained winds around 30kt, was first spotted on Thursday 8 September some 300km east of Barbados. It brushed past Barbados and St Lucia the following day with limited wind-damage and some flooding, and was upgraded to tropical storm status (means winds 34kt or more).

Gathering strength over the warm waters of the eastern Caribbean, Gilbert achieved hurricane status (means winds 64kt or more) , with gale force winds brushing the south coasts of Puerto Rico and the Dominican Republic. The island was swept by the full force of the storm , first from the north and then from the south, Central pressure at this stage was estimated at 960mbar, with maximum sustained winds of 100kn and highest gusts 120kt. Crops were damaged, the Yuna river flooded roads, utilities and agriculture were all damaged by Gilbert.

With the supply of warmth moisture cut off during its passage across the Yucatan Peninsula affecting the tourist complexes in Cancun and Cozumel, which is highly detrimental to the economic base. 60,00 are left without power and water supplies. Gilbert has similarly had a human impact on its journey of destruction, 26 people are killed. Gilbert lost power by time its eye reached the Gulf of Mexico. The weakening now ceased, but significant renewed intensification occurred as was feared, nor was there any significant change in course as was predicted. The dying hurricane spawned numerous tornadoes as far afield as the large Texan city of San Antonio. Landfall occurred at 2200 GMT on Friday 16th on a sparsely inhabited stretch of Mexican coastline midway between Tampico and the Us border; mean winds were still 105kt and central pressure 954 mbar. Gilbert now weakened rapidly losing hurricane status about 10 hours later, and it was finally down graded to a tropical depression at 1600 GMT on the 17th, near the city of Saltillo. It was the 210mm of rain which caused the Santa Catarina to break its banks, claiming 200 lives in that city.

There are certain conditions which favour hurricane formations such as Hurricane Gilbert. The sea surface temperatures were in excess of 30|C. There were no strong inversions which would prevent the growth of deep clouds- convectively unstable air. There was a high relative humidity in the middle troposphere. There was little change of the horizontal wind with increasing height (low vertical wind shear). An existing cyclonic rotation of the winds in the lower troposphere is also a condition that favours hurricane formation. The strong wind speeds, heavy rainfall and associated flooding of Hurricane Gilbert also contributed to the event.

In the long term Hurricane Gilbert caused huge losses to Jamaica s economy, estimated at some US$ 7 billion. This further increased Jamaica s debt, so that the government is now looking at the possibility of mining peat from Jamaica s coastal wetlands to provide a cheap fuel source, This will help the balance of payments and economically, makes sense. Unfortunately it would also remove the first line of defence against hurricane surges. To pay for the repairs from the last hurricane it seems Jamaica has to increase its vulnerability to the next- a very vicious vicious circle

The exact cause of hurricanes is uncertain but the following factors are also important; a location over the sea surface with temperatures about 27|C. This provides three things: a) the initial heat energy; b) the moisture that will power intense condensation and convection; and c) a friction free surface that allows a rapid, continous supply of warm moisture air into the vortex. Secondly, a location at least 5| north or south of the equator is a favouring factor for hurricanes.. The coriolis effect (caused by the earth s rotation underneath the air movements of the atmosphere) causes maximum twisting of air movement near the poles but minimum near the equator. It the storm develops too close to the equator the weak coriolis effect will stop a circular air flow developing so that the low pressure disturbance will rapidly fill in. The presence of an upper atmosphere air rotation which spreads air outwards (anticyclone). This ensures air sucked into the hurricane can spray out into the upper atmosphere. Without this the inrushing air at ground level would simply fill the low pressure and the system would die.

Accurate forcasting is the ket to preventing excessive storm damage and loss of life. Very little can be done to stop storms from occurring , although in some countries attempts have been made using cloud seeding . Clouds are seeded with chemicals such as silver iodide sprayed from an aircraft. If all goes well water droplets form around the chemical particles and later fall as rain. Cloud seeding can help to spread rainfall over a wider area and thus reduce the likelihood of a damaging downpour occurring in a small area. This work is still in its early stages, and as yet there are few examples of cloud seeding being used effectively for rain control in natural disasters. This technique may have been useful in examples such as hurricane Agnes in June 1972 were rainfall was produced exceeding 40cm in 24hours.

A tropical warning system would be a method of preventing loss to life and physical and economic damage. An example of this can be seen in Australia, where the Bureau of Meteorology has set up a warning system with centers at Brisbane, Darwin and Perth . When a tropical cyclone seems likely to occur the Bureau issues a Tropical advisory to tell the general public. If the tropical storm moves within 800km of the Australian coast, then a flash warning is given on television, by radio and the newspapers. A final announcement is made when the danger has passed. This policy of keeping people informed is very valuable and helps to reduce the loss of life and damage caused by such storms.

Another common response to hurricanes is to build storm proof buildings . Both the United States and the Australian authorities have tried to improve building designs. The problem that exists is that economically less developed countries (ELDC s) do not have the funding to create such safe structures. Thinking on a broader level, I believe it is vital that the debt burden is reduced so that countries are not forced to exploit the natural defences that they do have, such as forests, wetlands and mangrove swamps. The main problems with structures is that the buildings have poor foundations and roofs which can be easily blown away. Improvements include firmer foundations, securing the frame of houses to the ground, and bolting on the roof. In Bangladesh the government has built large banks of earth to stop tidal floods moving inland. The country now has a better forecasting and warning system to tell people of an approaching storm. There are also plans to evacuate people who live in the paths of approaching storms. Development policies that diversify the economy so that the poor do not need to live near flood prone land for a livelihood should be encouraged. Similarly, primary healthcare must be implemented so that the population is more resistant to disease in the aftermath of disaster.

Communications infrastructure should be improved to enable more rapid evacuations. The science of prediction must be continually developed by investing in appropriate technology and research. Again, this would only be possible in more economically developed countries as only they have the necessary funding. Perhaps it would be a good idea to increase the access of the poor to low interest loans to increase their recovery prospects after a disaster.

It is clear that at the moment total prevention is virtually impossible. While in EMDC s hazards may be just an inconvenience (even if it is a very expensive one), whilst it is still a matter of life or death in the developing world. Referring back to Philip Whitfields remark at the beginning, it seems man still remains virtually powerless against nature ,even as we approach the millennium.