**Hurricane Katrina (HIC case study) August 2005**

**1. The impact of the storm on people and the environment**

**Storm Characteristics**:

Category 4 - Extreme wind speeds between 131-155mph with a storm surge of over 6 meters.

**New Orleans and it physical landscape**

New Orleans is **low lying** with much of the city **below sea level.** It’s surrounded by water that includes the **Gulf of Mexico** to the South, **Lake Pontchartrain** to the North and The **Mississippi River** that flows through the city to the wetlands delta to the south.

**Planning**

The **National Hurricane Centre** predicted accurately where Katrina would make landfall and how strong it would be.

The city have built network of **levees and concrete walls** around the city to protect it from storm surges of 3-4 meters in the event of category 3 storms. **The levees broke**

The Major ordered an evacuation of the city - **80% were evacuated**. No assistance was given and it was mainly the poor without transport that remained.

Up to 20 000 people took refuge in the Superdome football stadium but there was a shortage of toilets and adequate sanitation. The atmosphere was described as very intense and unsafe

Loss of wetland environment due to continued urban expansion reduced the natural protection the wetland would have provided.

**Human Impact**

**Short term:**

\*Over **1200 people** were killed through drowning with some figures reporting up to 1800

**\*1 million people** were made temporarily homeless and displaced across the country.

\*There was a lot of looting and not just for food and water

\*Phone lines down @ other communication types.

\*Fraction of Louisiana's oyster harvest lost: **2/3 (valued at $181 million)**

**Long term:**

**\*160 000 homes** were completely lost – people forced to live in trailer parks for over 12 months

\*A reported **$150 billion** cost for insurance and recovery – financial loss for the region.

\*30% of New Orleans population never returned after Katrina.

\*Buildings and roads needed to be rebuilt.

\*Number of jobs eliminated in the Gulf Coast by Hurricane Katrina: **230,000**

**Environmental Impact**

**Short term**

**\***Flooding **-**Two thirds of the city was submerged by water

\* Over 500 sewage treatment plants were submerged spilling human waste into the city

\*2 major oil spills totaling 70 000 barrels of hydrocarbons into the water.

**Long term**

\*Between 60-90million tonnes of solid waste like building and damaged cars needed to be removed.

\*Contaminated water from sewage and industrial seepage has gone directly into the wetland affecting the ecosystem.

**2. How the state of development of the country influenced the storm’s impact**

Hurricane Katrina was not a typical HIC tropical storm it was the one of the most damaging hurricanes ever to hit a HIC

What were the reasons?

* The impact was felt mainly by the poor and not the wealthy
* There was no government provision for the **evacuation of the poor**
* New Orleans was **not sufficiently prepared** in sea defenses for a category 4 storm
* New Orleans is **very low lying**
* **The US Federal Emergency Management Administration (FEMA)** was criticized for a slow response. Eventual evacuation was completed by air and coach with the **30000 National Guardsmen** drafted in to maintain law and order. In total **$50 billion** was **allocated for rescue and recovery** (later increase to $150 Billion).

**Cyclone Nargis (LIC case study)**

On 2 May 2008 tropical cyclone Nargis hit the coast of Myanmar and devastated large parts of the low-lying Irrawaddy delta. Winds exceeding 190 kilometres per hour ripped through the Myanmar’s biggest city Yangon for more than ten hours.

**Short term**

**\***Sturdy structures damaged (350,000).

\*Power lines down.

\*Fatalities – 146,000 (80,000 died just in Laputta)

\*Many trees lay across roads disrupting communications.

\*150,000 displaced, in about 120 temporary settlements.

\*2.4mn affected people.

\*Flooding

\*Shortage of basic supplies – people scavenge for food and materials to build shelters.

\*42% of food stocks destroyed.

**Long term**

* Millions left homeless, especially in rural parts, where around 95% of homes were wiped off the face of the planet.
* Trauma
* Orphans
* 600,000 hectares of agricultural land flooded and 60% of farming implements destroyed.
* Fishing boats destroyed
* Cattle killed.
* Lack of clean water – water diseases.
* Trees uprooted.
* Broken bridges & blocked/ damaged roads
* 75% of hospitals and clinics in the area badly destroyed or damaged and thus need repairing or rebuilding.
* Damage to the economy $4bn

**Management response – Nargis**

**Preparation**

\*India’s meteorological agency, which monitors cyclones in the Indian Ocean, says it warned the Burmese authorities 48 hours before the storm struck. The agency said they told the Burmese where the storm would hit and how severe it was expected to be.

\*Burmese citizens have complained that they were not properly alerted, but Burmese state television issued a statement in English saying warnings were given several days beforehand.

"Timely weather reports were announced and aired through the television, and radio in order to keep the people safe and secure in nationwide," the statement said.

Certainly state media did give some warnings of a storm, but people in Burma say the severity of the cyclone was unclear and no instructions were given as to what action they should take.

\*Officials from the UN's disaster reduction agency in Geneva say it is clear many people did not have time to seek refuge in secure buildings.

They say the scale of the devastation suggests there was not a proper early warning system.

**Emergency Response**

\*Since 62 ruled by Military junta with poor human rights and limited contact with outside world. Refused to accept scale of situation or accept outside help.

\*Lack of information and an apparent state of confusion for most of the aid and rescue operations once allowed in.

\*Burma’s ruling generals were criticised for being slow to accept international aid. Thus Burmese left without shelter to beg beside the road for food.

\* Military junta failed to deal with the aftermath with rotting corpses left to float along the rivers and inlets.

\*Aid agencies also faced physical difficulties, as roads and bridges had been flooded or washed away.

\*Private aid given to Buddhist monks to distribute rather than mistrusted government agencies.

**Recovery response**

\*Relief and reconstruction work will cost at least $1bn argues the UN.

\*The estimated figure covers the most urgent needs such as food, agriculture and housing for the next three years.

\* Many citizens still live in shacks 12 months after the cyclone hit. Many have no money to rebuild and it is estimated there is around 100-150,000 people in this situation.

\* Many of those slightly more fortunate, have only built sub-standard accommodation, which would not survive another cyclone.

\*The Red Cross is trying to support families in this situation. The community selects families who receive money form the organisation to help rebuild.

\*12 months after many also have no income, have no clean water and suffer from trauma. They also struggle with debt, as they have had to borrow to help rebuild their homes or buy new seeds etc.

\*Many volunteers joined the Red Cross, after the cyclone hit and it was able to provide aid in some form to over 1mn people in 6 months.

\* The Red Cross set up the Cash for Work Livelihood programme. They set up 85 projects in 11 townships. The community decides which project is most needed in their area ( for example building a new raised road) and who should be employed. Only one person from each household can be given a job, so that the money is evenly distributed. Those employed earn $2 a day, which can enable them to keep their children in school, or buy a roof.

\* The Red Cross also provided small grants to farmers and fishermen to enable them to purchase new seeds or nets.

\* The Red Cross provided support to those suffering from trauma. It is a detailed programme which covers most villages, with many people trained to provide the support. They have even began working with local temples to try and build in meditation into the recovery programme.

**Management response – L’Aquila**

**Facts**

\*5th April 2009.

\*5.8 magnitude on the Richter Scale.

\*Focus- 6 miles depth- shallow

\*Epicentre 10km north of L’Aquila.

\*African plate, colliding with Eurasian plate -subduction. Resulted in fault stress.

**Preparation**

\*National government seismic department- raises public awareness about preparedness. All students learn about earthquakes.

\*National seismic risk map, updated regularly.

\*All building must be retrofitted or built to withstand earthquake events- dependent on the seismic map. But building laws ignored, plus many buildings built during the Middle Ages.

National volunteer force to help in the event of a natural disaster.

\*Guiilani had observed increased radon in the water and had pinpointed L’aquila to be hit by a strong earthquake. Unfortunately, he was ignored as at least eight physical phenomena are capable of showing definable 'signatures' in the hours before earthquakes, no single phenomenon has proved reliable enough to act as a routine predictor.

Scientists were prosecuted and found guilty in 2012 for failing to warn the population

**Emergency Response**

\*11,000 volunteers helped with the aftermath.

\*34,000 homeless housed in 161 tented settlements.

\*Red Cross set up a field kitchen, providing 10,000 meals a day.

\*Italian post office sent mobile offices to homeless camps to allow access to money and pensions.

\*Italian Sky stopped billing people and provided TVs to homeless camps.

\*Italian train companies provided free tickets and carriages for people to sleep in.

\*Mobile companies provided free mobile phones.

\*30,000 short-term hardship grants worth 2.4 billion Euros;

\*All tax payments stopped by the government.

**Recovery response**

\*Government to pay for 100% of rebuilding and reconstruction.

\*New towns to be funded by the Government, to generate economic growth.

\*Those effected could live 5 years rent free in newly built apartments ( all amenities provided), but were criticised as lacked soul, no local services or community spirit.

\* Government criticised for not rebuilding old communities and many citizens stormed the building sites on weekends to protest and do the work themselves