CAIE Geography Pre-U

3A: Meteorological Hazards

Case Studies

Moore, Oklahoma 2013 Tornado

Cause
Two days of storms turned into several supercell thunderstorms. One of these thunderstorms which contained strong updrafts of winds soon turned into a tornado.

Consequences and impacts
Killed 24 people and **120 people needed treatment in hospital**. **300 homes were destroyed** and there was **$2 billion worth of damage**. The tornado flattened one elementary school and another one collapsed which **killed seven children**.

Management
Supplies such as food, hygiene kits, blankets, cleaning supplies and tarpaulins were provided in the short-term. School materials, clothes and household supplies were given later on. In the long-term building materials were provided and people were helped to rebuild their homes and other important infrastructure.

Preparation
Planned responses and **drills** at schools, businesses and emergency departments. People told to secure any outdoor storage units. Many people have **underground shelters** or know a safe place to go which is close by.

The Beast from the East, UK, 2018 Blizzard

Cause
Stratospheric warming **disrupted the jet stream**. There was also a huge rise in temperature 18 miles above the north pole which **weakened the jet stream** further. Both of these events allowed a **cold air mass from Russia to move over the UK**. This below-freezing air picked up moisture from the North Sea. This air mass also met with storm Emma which created a weather front and created conditions ideal for blizzards to form.

Primary impacts
10 people died. 50cm of snow fell on high ground and in some areas temperatures dropped to -12°C.

Secondary impacts
Hundreds of schools were forced to close, **hospital operations were cancelled** as well as **rail and air services cancelled**. There was also a **shortage of food**.

Response
A **red weather warning** was issued and **advice** on how to cope was given. The **Royal Air Force** helped with relief efforts and sometimes the military helped as well.

Mitigation
No mitigation would be taken as events as severe as these don't happen often so it's not worth investing in mitigation strategies.

Hailstorms in India

Causes
When **water freezes together in the upper regions of a thunderstorm cloud**. A droplet of water will freeze at a certain height in the storm cloud. It will then begin to fall but is pushed back upwards by strong updrafts. Another water droplet will then freeze onto it and it will begin to fall. This process repeats until it is too heavy to be lifted back up by the updrafts and it falls as hail. Occurs in the summer in India because of the formation of **strong convection storms** which are formed when air is lifted by higher temperatures or over the mountains.

Impacts
In February 2018, hailstones **damaged 0.476 million hectares of crops**. Hailstorms can also cause damage to buildings and can kill people. In **1888 a hailstorm killed 250 people**.

Smog

Impacts and consequences
18,000 people die every day worldwide as a result of air pollution. In London, more than **one person an hour dies prematurely.**

Management and mitigation
Shifting to **100% renewable energy** by 2050 would prevent 90 million premature deaths. **High-quality transport systems** need to be constructed such as in Curitiba, Brazil to reduce the number of cars in the cities. People also need to change the way they live, work and run the economy to reduce pollution.

Hurricane Matthew, 2016

Background
Hurricane Matthew affected **Haiti and Florida** in the USA. It hit Haiti from the 3rd to the 5th of October 2016 and Florida between the 6th to the 6th of October 2016. Haiti and Florida have completely different economic situations. The **GDP per capita in Haiti is $730 compared with $39,500 in Florida**. The life expectancy in Florida is **15 years greater** than that in Haiti and the **literacy rate is 31% more**.

Preparation
In Haiti, most people are living in dire misery, inhumane conditions and in **poorly constructed houses**. They were **not given much warning** and evacuation was only ordered for high-risk

areas. In comparison in Florida, there were **mass evacuations** and residents stocked up on food, water and petrol and attached shutters and plywood boards to their homes.

Damage to infrastructure
In Haiti, **80% of buildings in Jeremie were destroyed** and **30,000 homes were destroyed in the Sud Province**. They were mainly affected by landslides and flooding. In Florida **282,000 people were affected by power outages**, schools were closed and there was **$7.5 billion in insured losses**.

Social impacts
In Haiti, **1,000 people were killed** compared with **33 in the USA**. **175,000 people were made homeless in Haiti and 1.4 million were directly affected**.

Secondary effects
In Haiti, there was a **food crisis** due to crops being destroyed this also caused the price of rice to increase. **Water-borne diseases** were also very prevalent and **cholera killed 29 people**. After Hurricane Matthew in the USA, **1 million people were left without power**.

Responses
In Haiti, the main help came from **NGOs and charities**. After the hurricane, NGOs helped prepare the Haitians for a recurrence of another hurricane. Hygiene kits and water treatment were handed out to stop cholera. Tarpaulins and food supplies were provided by **Action Aid**. The UN development programme started **cash-for-work programmes** and **Christian Aid helped to establish early warning systems**. In Florida, **70 boat crews performed 2,000 rescues** and **helicopters did 94 rescue missions** from rooftops. Insurance helped most people with **$7.5 billion given out**.