GCSE Geography Knowledge Organiser – 3.2.2 How might the risks associated with tectonic hazards be reduced?

Monitoring

Before a volcano erupts, **magma must rise to the surface**. This movement of magma can be detected if the volcano is carefully monitored.

There are an increased number of small **earthquakes** (measured using **seismometers**) as the magma forces its way up through cracks in the rock.

The **ground changes shape** (measured using **tiltmeters** or GPS devices) as the magma pushes out the rock around it.

Temperatures rise (measured using thermal cameras) as the hot magma gets closer to the surface.

Monitoring may also give an indication as to the size and direction of any blast, allowing more accurate predictions of pyroclastic flows.

Tsunamis are monitored with seismographs and ocean buoys to detect changes in sea levels. Coastal areas at risk can then be warned, giving them time to evacuate.

New building technology

Buildings can be designed to reduce the effects of secondary volcanic hazards such as lahars by building them on **stilts** to allow the lahar to run safely below them (a similar design can help reduce the impacts of a Tsunami). A **steep-sloped roof** will prevent ash build-up and therefore reduce the risk of the roof collapsing under the weight.

Aseismic buildings are designed to be earthquake proof. Steel-framed buildings with **cross bracing** are both strong and **flexible** enough to survive even the strongest of earthquakes. Cheaper alternatives such as **bamboo** have a similar impact in less developed countries.

Hi-tech solutions such as **counterbalance weights** on the roof of buildings or **isolating** shock absorbers in the foundations keep even the tallest buildings safe during an earthquake. Low-tech solutions include **wide roof eves** to protect people from falling debris and **large open spaces** between buildings for evacuees and emergency services to gather.

Emergency planning

Emergency services have their own specialised emergency teams trained specifically to deal with tectonic hazard impacts such as searching for survivors in collapsed buildings. They are equipped and trained to use specialist equipment such as **CO_2 detectors** to find people trapped under tonnes of rubble.

Educational programmes teach people how to react during an earthquake and what supplies to have to hand should you have to evacuate your house.

Evacuation routes are clearly signposted and avoid the areas more likely to suffer damage from the tectonic event. Emergency shelters are ready in safe areas along with stores of emergency supplies of food, water and shelter.

Hazard mapping

Hazard mapping uses historical data, real-time monitoring and relief models to **predict** the most dangerous areas during a tectonic event. Areas such as valley floors and steep slopes are particularly dangerous. By understanding where the threats will be greatest, we can **control the development** of buildings and infrastructure in these areas. This reduces the impact on infrastructure and the economy. We can control house building as well as **limiting people's access** to these areas, thus reducing the impact on health.

Suitable evacuation sites can be identified as well as areas to build emergency shelters such as the 700 built after the 2010 Mt. Merapi eruption.