Example answer Question 5b

(b) Assess the extent to which prediction and monitoring technology can help reduce the impacts of natural disasters.

(20)

In the recent years, the number of natural disasters have increased dramatically, 1900s = 10 annual natural disasters VS 2000s = 400 annual disasters. Many people believe that this is due to the improvement of technology and us being able to record more disasters, even the ones with small social impacts, located in remote areas.

However, improvement in technology can't be the only reason for more disasters being recorded in the past years. there's a clear increase in hydro-meteorological disasters which we know is mainly due to anthropogenic activity. With the rise of disasters, many more people are affected but fewer are actually dying and this is due to the prediction and monitoring technology. For example during the period between 1900-1940s, 500,000 people died per year because of natural disasters, and now that number has dropped down to 50,000. The dramatic decrease in the numbers of deaths shows that as our technology improved, warning systems, evaquation systems etc. were invented and placed even into the LICs. Our ability to predict disasters also means that future development can be strategically located in an area with less hazards. for example in the past, new settlements were often started by the river deltas because it was the area with the most economic opportunities. Over time, as sea levels rose, those areas began to flood very often e.g. Accra in Africa is located near river detas, and if that area floods, it puts more people at risk (40 million).

Nowadays, we know which areas are likely to flood in the future, or which areas are likely to experience earthquakes and we can place / relocate important areas into places which are safe.

The impacts of natural disasters can be social, economic and environmental. ~~[illegible]~~ Since the 1980s, economic costs of natural hazards have actually increased, from $20 billion to $160 billion. This is because more population, means more important infrastructure which is much more expensive to build, so even though we are able to predict and monitor hazards, not all impacts can be lessened by the improvement in technology.

I have already spoken about social impacts (deaths) being decreased by better technology, other impacts which could be lessened are environmental. Because are now able to tell where storms can strike, or where floods are a common occurance, those areas can use different methods of engineering in order to decrease the impacts of a hazard e.g. building a sea wall in an area prone to flooding.

Finally prediction & monitoring does link into the disaster risk equation as it gives countries a higher coping capacity. However, only because we are able to predict certain disasters, doesn't mean we can protect our-selves from them. Furthermore, the exact prediction of mega-disasters related to tectonic activity still haven't been achieved. Geophysical hazards continue to occur without us being able to predict or prepare for them. The example is the earthquake in Japan, 9.0 on richter scale which caused a tsunami to hit the nuclear power plant Fukushima. We weren't able to predict or monitor the seismic activity, and the impacts of that disaster were extremely high.

(Total for Question 5 = 30 marks)

In conclusion, yes prediction and monitoring technology can help us reduce the impacts of natural disasters, however most of the disasters that we can predicts are hydro-meteorological, and we are able to cope with those. Geophysical hazard prediction is still a problem in many cases, so monitoring & prediction isn't really an option.

Question number	Assess the extent to which prediction and monitoring technology can help reduce the impacts of natural disasters. (20 marks)
5 (b)	**AO1 (5 marks)/AO2 (15 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance (page 3) and the qualities outlined in the levels-based mark scheme below. Responses that demonstrate only AO1 without any AO2 should be awarded marks as follows: • Level 1 AO1 performance: 1 mark • Level 2 AO1 performance: 2 marks • Level 3 AO1 performance: 3 marks • Level 4 AO1 performance: 4-5 marks **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: AO1 • Prediction of natural hazards means being able to state, with actionable certainty, when and where they will strike. • This is done through monitoring technology that can be used on volcanoes (tiltmeters, seismometers) and for hydro-met hazards such as cyclones (satellites). • Impacts include both economic losses (insured and uninsured) and human losses (trends) in terms of deaths and numbers affected / homeless. • There are other ways of reducing impacts, including preparation and response – both short and long term. AO2 • Cyclones and other storms are routinely monitored using aircraft, satellites and weather stations and the data is used to make landfall and parameter predictions, which is the basis for warning and evacuation - this has the potential to drastically reduce human losses although economic impacts often remain very high. • In order to reduce economic losses costly storm and flood protection is needed, so in developing countries prediction is especially important. • Volcanic activity is increasingly monitored using sophisticated equipment and many volcanic eruptions can be predicted with accuracy and warnings issued; this is critical as the hazards themselves cannot be stopped so moving people out of harm's way is very important. • The hazard least likely to be managed by prediction is earthquakes, which cannot be predicted; it can be argued that for this hazard the best management method is preparation, i.e. hazard resistant design and land use zoning for instance. • Conversely tsunami can be predicted and monitored over the period of hours following the initial earthquake and warnings issued – reducing human impacts but probably not economic loses. • Drought and flood risk can also be monitored, although in these case defences and adaptations are often more important as the hazards are

	more frequent, e.g. flood defences, farming adaptations to cope with water supply falls. • Other parts of the Hazard Management Cycle, e.g. immediate response, recovery, could be considered as important (even more important) as part of a wider evaluation of the role of monitoring and prediction.

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–5**	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Applies knowledge and understanding of geographical ideas, making limited and rarely logical connections / relationships. (AO2) • Applies knowledge and understanding of geographical information / ideas to produce an interpretation with limited coherence and support from evidence. (AO2) • Applies knowledge and understanding of geographical information / ideas to produce an unsupported or generic conclusion, drawn from an argument that is unbalanced or lacks coherence. (AO2)
Level 2	**6–10**	• Demonstrates geographical knowledge and understanding, which is occasionally relevant and may include some inaccuracies. (AO1) • Applies knowledge and understanding of geographical information / ideas with limited but logical connections / relationships. (AO2) • Applies knowledge and understanding of geographical ideas in order to produce a partial interpretation that is supported by some evidence but has limited coherence. (AO2) • Applies knowledge and understanding of geographical information / ideas to come to a conclusion, partially supported by an unbalanced argument with limited coherence. (AO2)
Level 3	**11-15**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and accurate. (AO1) • Applies knowledge and understanding of geographical information / ideas to find some logical and relevant connections / relationships. (AO2) • Applies knowledge and understanding of geographical ideas in order to produce a partial but coherent interpretation that is supported by some evidence. (AO2) • Applies knowledge and understanding of geographical information / ideas to come to a conclusion, largely supported

		by an argument that may be unbalanced or partially coherent. (AO2)
Level 4	**16-20**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Applies knowledge and understanding of geographical information / ideas to find fully logical and relevant connections / relationships. (AO2) • Applies knowledge and understanding of geographical information / ideas to produce a full and coherent interpretation that is supported by evidence. (AO2) • Applies knowledge and understanding of geographical information / ideas to come to a rational, substantiated conclusion, fully supported by a balanced argument that is drawn together coherently. (AO2)