

RISK AND VULNERABILITY IN DISASTER MANAGEMENT

Investigate the relationships in the RISK / DISASTER equation

Risk, as shown in the **disaster risk equation**, increases as hazardous events become more common, people become more vulnerable and their capacity to cope decreases.

Risk can be reduced by reducing vulnerability, increasing capacity or reducing hazard frequency and/or magnitude.

$$R = \frac{H \times V}{C}$$

R = risk, H = frequency or magnitude of hazard,

V = vulnerability level, C = capacity to cope

Since there is little/no evidence that the magnitude or frequency of tectonic events is increasing, any increases in risk must be due to increasing vulnerability of certain populations and/ or a reduction in the capacity of a society to cope

**Note. Some evidence points to increasing number of earthquakes but this may be due to better detection and reporting techniques
source : EM-DAT international disaster database**

Risk :The probability of harmful consequences, or expected losses, resulting from interactions between natural or human-induced hazards and vulnerable conditions.

Hazard : A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

Vulnerability :The conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards.

Capacity to cope : A combination of all the strengths and resources available within a community, society or organisation that can reduce the level of risk, or the effects of a disaster.

Vulnerability is important because it helps to determine the exact impact a hazard will have on a population.

In general, developing countries and regions are more vulnerable than developed ones.

Capacity to cope is generally lower in the developing world, so hazard impact lasts longer than in the developed world.

Vulnerability has social, economic, environmental and physical aspects.

Poverty, poor social conditions, environmental degradation and unfavourable physical geography all increase vulnerability.

Increasing vulnerability

- Population growth
- Urbanisation and urban sprawl
- Environmental degradation
- Loss of community memory about hazards
- Ageing population
- Ageing infrastructure
- Greater reliance on power, water, communication systems
- Over-reliance on technological fix

Decreasing vulnerability

- Warning and emergency-response systems
- Economic wealth
- Government disaster-assistance programmes
- Insurance
- Community initiatives
- Scientific understanding
- Hazard engineering

Explaining the impact of Natural hazards

The human context in which hazards occur is as important and often more important than the geophysical causes of the event.

Factors influencing the human impact of natural hazards include:

1. **Population Density** in the area affected
2. Prior **experiences** of hazards in the area
3. **Traditional** methods of **coping** with hazards
4. The degree of accuracy in **predicting** the hazard
5. The effects of any hazard **warning, preparation** and / or **evacuation** procedures
6. The **speed** and **effectiveness** of local, national and international emergency and long term **relief services**
7. The overall **level of economic development** (LEDC MEDC)
8. Perception of those involved

Two examples illustrate the changes in population totals and densities and their possible impact

California

1906 (date of San Francisco earthquake)	Population 1.5 millions
	San Francisco 350,000
2005	Population 36 millions
	San Francisco 750,000

Therefore despite improvements in preparation, monitoring, prediction etc

A Californian earthquake today is likely to be more hazardous!

Italy Vesuvius

Pompeii AD 79 estimated population of 20,000 when volcanic disaster occurred

Today Naples has a much larger population and population density 1 million people live within 7km of the volcano and 3 million people would be displaced by an eruption similar to that in AD 79

TIME be prepared to discuss, define and elucidate the possible '**TEMPORAL**' aspect of the question

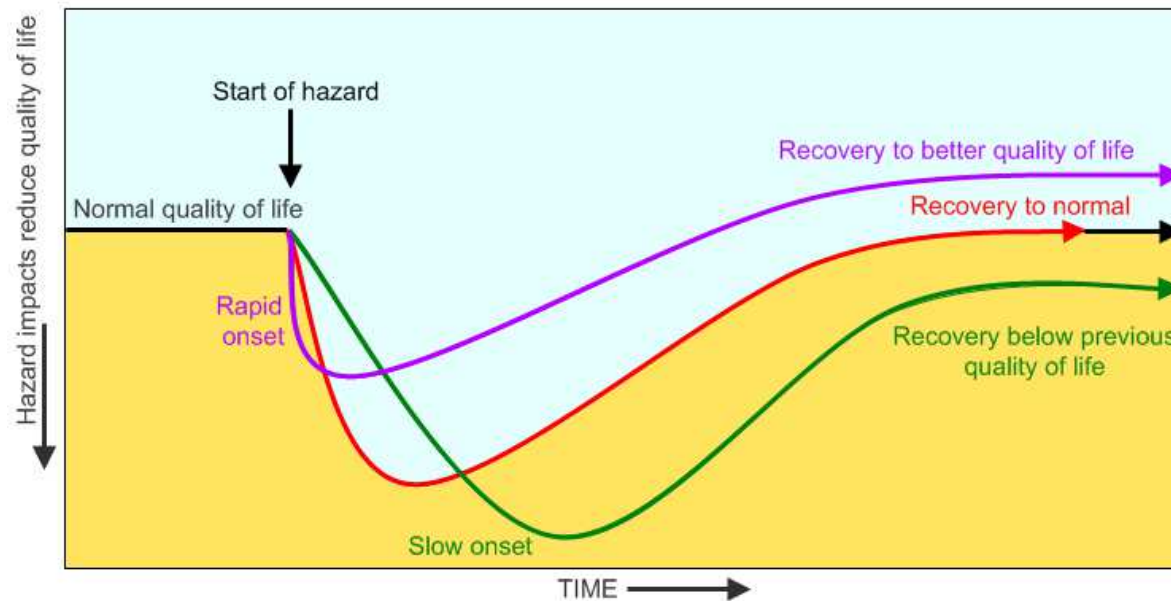
This can be looked at in 3 ways

1. The changes that have occurred through time from the past to the present
2. The time period from the immediate pre-event period through primary, secondary impact through to the response and recovery 'THE PARK MODEL'
3. The actual time of the event, season, month, day of the week and time of day that may affect the impact of the event. Eg Kobe earthquake occurred in the early morning when most people were still in their homes which were less able to stand the earthquake than more modern offices and factories would have....impact greater!!

1. Preparation, advances in technology and prediction of events, warnings and improved building codes and practices all mitigate against increasing impacts ie. reducing probable impacts in recent times
BUT increasing vulnerability, pop increase etc etc (see other notes) have made tectonic activity increasingly hazardous.

'DISCUSS' in question may allow both sides of the argument

2.



Be ready to discuss variations in the model based on levels of preparedness, levels of development and levels of response AND relate to your case studies