**Vulnerability and Resilience of Ecosystems**

***Causes of Ecosystem vulnerability:***

**Natural changes to Ecosystems:**

* Immediate – e.g. drought, flood, fire, volcanic eruptions, storm surge, cyclone. Immediate natural changes can have a dramatic effect on ecosystems, and in severe cases can wipe out the ecosystem in it’s entirety.
* Gradual – e.g. changes in climate, movement of species, adaptation to changes – natural selection. Gradual changes are likely to cause long-term changes to an ecosystem, such as changes to species found and numbers of species, functioning of the ecosystem.

Humans have the ability to simplify natural ecosystems in order to grow food, build habitats and remove or extract resources. Unwanted species are removed and other species are provided with an environment made favourable for their survival by human intervention. Human-induced change can be intentional, inadvertent, or through negligence.

 **Human induced changes:**

* Immediate – deforestation, overgrazing, ploughing, erosion, pesticides, toxic substances, urbanisation, mining and war
* Gradual – salinisation and soil waterlogging, compaction and erosion, pollution, habitat loss, species loss, loss of biodiversity, introduction of exotics

***The level of vulnerability or resilience is determined by:***

**Location**

The following locational factors can affect the functioning of ecosystems:

* latitude
* distance from the sea
* altitude
* microclimatic features

The greater the degree of specialisation an organism has to a particular set of environmental conditions the more vulnerable that organism is to the changes in those conditions.

 **Extent**

Ecosystems that are restricted to relatively small areas or have already been subject to extensive disturbance are especially vulnerable.

**Linkages:**

Ecosystems that have low levels of interdependence are much more vulnerable to change. For example if an organism can rely on only one form of producer for its survival, and the producer population is wiped out then the consumer is it great risk of also being wiped out in the area.

**Biodiversity:**

* genetic: Genetic diversity favours the survival of a species as it increases the chance that some members of the population will have the characteristics to be able to withstand changes in environmental conditions
* species: The greater the species diversity within an ecosystem the more able the ecosystem will be to withstand threats.
* ecosystem: The greater the number of habitats, biotic communities and ecological processes occurring, the easier it will be for the ecosystem to recover from threats or changes in environmental conditions.

Natural changes to ecosystems can be severe and drastic, resulting in an ecosystem having to adapt or change in a short period of time in order to survive. More often, natural changes occur over an extended period allowing ecosystems to gradually change to suit changing conditions.

**Extended response:**

Using a variety of examples from the text and your own knowledge, write a report outlining the effects of environmental stress on organisms, populations and communities.