TT TEXTBOOK TESTBANKS

Solutions Manual for Natural Hazards and Disasters 6th Hyndman

SOLUTIONS MANUAL SAMPLE PREVIEW

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Solution and Answer Guide

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CHAPTER 1: NATURAL HAZARDS AND DISASTERS

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ANSWERS TO QUESTIONS FOR REVIEW

1. What are some of the reasons people live in areas prone to natural disasters?

   Answer:
   For the scenic view, to experience picturesque streams, to enjoy the seclusion and scenery of the woods, to enjoy ocean views or the beach more intimately, for fertile land, and for cheap land.

2. Is the geological landscape controlled by gradual and unrelenting processes or intermittent large events with little action in between? Provide an example to illustrate.

   Answer:
   Intermittent large events: streams run clear most of the year but get muddy and erode their channels during floods.

3. Some natural disasters happen when the equilibrium of a system is disrupted. What are some examples?

   Answer:
   Slopes are oversteepened by roadcuts that causes slope failure or stress applied to Earth's surface produces strain on a body of rock, ultimately resulting in an earthquake. A bulge may form on a volcano as molten magma slowly rises into it; then it collapses as the volcano suddenly erupts.

4. Contrast the general nature of catastrophic losses in developed countries versus low-income countries. Explain why this is the case.

   Answer:
   In developing countries, there are greater numbers of deaths from natural disasters, whereas in developed countries, there are typically greater economic losses. Wealth and education of a country are determining factors to the type of losses or damage.

5. What are the three most deadly hazards in the United States?

   Answer:
   Heat and drought, flooding, and tornado are the three most deadly hazards.

6. What are the main reasons for the ever-increasing costs of catastrophic natural events?

   Answer:
   Overall increase in world population and human migration to more hazardous areas. It is also a function of increased value of properties at risk.

7. Why are most natural events not perfectly cyclic, even though some processes that influence them are cyclic?

   Answer:
   Multiple independent variables affect most events and overlapping “cycles” give noncyclic variation. Even with cyclic events, overlapping cycles make resultant extremes noncyclic, which affects the predictability of a specific event. So far as anyone can tell, most episodes, large and small, occur at seemingly random and essentially unpredictable intervals.

8. What is the difference between a prediction and a forecast?

   Answer:
   A prediction provides an exact time, location, and magnitude of a hazardous event, while a forecast provides the probability of a natural disaster occurring in a region within a few decades.

9. Give an example of a feedback effect in natural processes.

   Answer:
   Global warming causes more rapid melting of Arctic sea ice, which lessens the amount of white ice and increases the amount of dark seawater in the world. Darker seawater absorbs more solar energy than white ice, causing even more sea ice melting.

10. Give an example of a fractal system.

    Answer:
    Numerous small streams (e.g., viewed at a close scale such as part of a state), many larger streams (e.g., viewed over a larger area such as the United States), and very few giant rivers (e.g., the Mississippi as viewed on a world map). Also, numerous small landslides, fewer large landslides, and only rarely a giant landslide.

11. Describe the general relationship between the frequency and magnitude of an event.

    Answer:
    The magnitude of an event is inversely proportional to the frequency of the type of event: as frequency decreases, magnitude increases. **By the Numbers 1-1**.

12. If the recurrence interval for a stream flood has been established at 100 years and the stream flooded last year, what is the probability of the stream flooding again this year?

    Answer:
    One in hundred (or 1/100)

13. What are the two main factors insurance companies use to determine the cost of an insurance policy for a natural hazard?

    Answer:
    The probability of an event occurrence (e.g., recurrence interval) and the cost of the probable loss (in dollars) from the event. **By the Numbers 1-2.**

14. When people or governmental agencies try to restrict or control the activities of nature, what is the general result?

    Answer:
    The problem is transferred to somewhere else or onto someone else. For example, constricting river flow with a levee backs up floodwater, potentially causing flooding of an upstream neighbor's property.

Answers to Critical Thinking Questions

1. If people should not live in especially dangerous areas, what beneficial uses could there be for those areas? What are some examples?

    Answer:
    Volcanic areas: The volcanic ash in these regions weathers into richly productive soil, making them good farmland.
    Floodplains: Large floodplains offer good agricultural soil, inexpensive land, and natural transportation corridors, attracting people for farming and settlement.
    Coastal areas: Despite the risks of coastal storms, living along the coast provides ocean views and an intimate experience with the sea.

2. What responsibility does the government have to ensure that its citizens are safe from natural hazards? Conversely, what freedom should individuals have to choose where they want to live?

    Answer:
    The government shoulders the responsibility of safeguarding citizens from natural hazards through research, forecasting, and mitigation efforts, including funding programs and relocating vulnerable individuals. Yet, individuals should retain the freedom to choose their residence, albeit within the confines of government measures aimed at reducing risks and losses from natural disasters.

3. A small town suffering economic losses from the closure of a factory considers a plan to build a new housing development in an area where there is a record of infrequent flooding. Make a case for and against this development. In your case for the development, describe what measures need to be taken to minimize hazards.

    Answer:
    Case for Development: Building a new housing development could rejuvenate the town's economy, providing jobs and attracting new residents. To minimize flood hazards, thorough risk assessments, improved drainage systems, raised building foundations, and community education on evacuation plans are essential, ensuring safety and sustainable growth.

4. Should people be permitted to build in hazardous sites? Should they expect government help in case of a disaster? Should they be required to pay for all costs incurred in a disaster?

   Answer:
   Building in hazardous sites should be regulated to minimize risk. While government aid may be provided in disasters, individuals should primarily bear responsibility for their choices, including covering costs incurred due to their decision to build in such areas.

5. What are the main natural hazards in the region where you currently live or where you grew up?

   Answer:
   The United States faces various natural hazards across its regions. Common ones include hurricanes along the Gulf Coast and East Coast, tornadoes in the Midwest and South, earthquakes in the West, wildfires throughout the West and Southwest, and flooding in many parts of the country.

6. If you sell a house that is later damaged by a landslide, who is responsible? That is, what are the main considerations?

   Answer:
   Developers, motivated by profit, may prioritize financial gain over the potential risks to buyers. If the seller knew about the landslide risk and failed to disclose it, they could be liable. The terms of the sale contract, including any warranties or indemnifications, may allocate liability. Some jurisdictions have regulations governing liability for property sales and natural disasters. Ultimately, determining responsibility often involves legal analysis and can vary based on specific circumstances and applicable laws.

7. When the federal government provides funds to protect people's homes from floods or wildfires, individual homeowners benefit at the expense of taxpayers. What are the two main types of alternatives to eliminate taxpayer expense for natural hazard losses?

   Answer:
   Public awareness and education programs.

8. What is meant by the expression "Those who ignore the past are condemned to repeat it"? Provide an example related to natural hazards.

   Answer:
   The expression means that failure to learn from historical events leads to their recurrence. For instance, neglecting past instances of flooding and building in flood-prone areas without adequate precautions can result in repeated property damage and loss of life.

9. When we note that people need to take responsibility for their own actions when living in a hazardous environment, what is different about the behavior of low-income people living in underdeveloped countries?

   Answer:
   Low-income people in underdeveloped countries may have fewer resources and options to mitigate risks in hazardous environments. They may lack access to safe housing, infrastructure, and insurance, making it challenging to take responsibility for their actions in the same way as those in more developed regions.