

Natural Hazards Practical Exercise 1.

Impact of Environmental Disasters

The aim of this exercise is to help you to think about what sort of disasters cause the greatest loss of life, and what is the spatial distribution of this death toll.

Need: pen, paper, calculator.

Event	No. of Events	Loss of Life						
		Asia	Oceania	Africa	Europe	South America	Caribbean & Central America	North America
Earthquake	180	354,521	18	18,232	7,750	38,837	30,613	77
Tsunami	7	4,459	0	0	0	0	0	60
Volcanic Eruption	18	2,805	4,000	0	2,000	440	151	34
Flood	333	170,664	77	3,891	11,199	4,396	2,575	1,633
Hurricane	210	478,574	290	864	250	0	16,541	1,997
Tornado	119	4,308	0	548	39	0	26	2,727
Severe Storm	73	22,008	0	5	146	205	310	303
Fog	3	0	0	0	3,550	0	0	0
Heatwave	25	4,705	100	0	340	135	0	2,190
Avalanche	12	335	0	0	340	4,350	0	0
Snowfall and Extreme Cold	46	7,690	17	0	2,780	0	200	2,510
Landslide	33	4,021	0	0	300	912	260	0

Table 1. Summarises the loss of life by disaster type and by continent for the period 1947-1980.

Discuss in groups and present to the class your thoughts on the following topics:

1. Which types of disaster are more costly in terms of human life and why.
2. What is the relative importance of the social vulnerability of different regions as compared with the physical characteristics of the hazard? Compare developing world countries to more developed countries such as in Europe (UK) and Northern America.

To support your case you should be prepared to:

- Tease out the data and get to know it, for example, you may want to calculate deaths per event, or group the data according to type of hazard.
- Consider how appropriate it is to simplify the data by grouping agents of disaster or continents, and what criteria might be used for this.

Natural Hazards Practical Exercise 1 Solutions:

This exercise presents the students with a lot of data that they have to synthesise to get some sort of coherent picture. It encourages them to explore and play with data, simplifying by grouping and calculating totals and averages.

The students may choose to simplify the data by ignoring hazards with low impacts, or consider different genetic categories of hazards (useful for answering question 1). For example, seismic hazards (volcanoes, earthquakes and tsunamis), mass movement hazards (landslides and avalanches), atmospheric hazards (hurricanes, tornadoes, severe storms) meteorological hazards (flood & drought- the latter has been excluded from this dataset). The students may also consider each continent by degree of economic development (useful for answering question 2).

1. Explain which types of disaster are more costly in terms of human life and why.

Answer:

In terms of number (Frequency) of events:

Floods>>Hurricanes>Earthquakes>>Tornado>>all others

In terms of total deaths:

Hurricanes>Earthquakes>>Floods>>all others

In terms of deaths per event:

Earthquakes & Hurricanes>>Fog(!)>Floods>all others

Example: From the dataset we see that floods occur more commonly (have a higher Frequency) than earthquakes and hurricanes. However, earthquakes and hurricanes have a higher death toll than floods. This suggests that the Magnitude and (or) Scope of the earthquakes and hurricanes is greater than that of the floods.

In general, death tolls are influenced by a number of factors: the area of influence, the duration and frequency of event, and nature of impact on humans (this varies according to the type of event - discuss these differences. The suggestion is to focus on the three major disaster types: earthquakes, hurricanes, floods).

2. Discuss the relative importance of social vulnerability of different regions as compared with the physical characteristics of the hazard.

An answer:

Environmental disaster generally results from interaction, in time and space, between the physical exposure to a hazardous process and a vulnerable human population. You need to consider these two sides of the equation. For example, Asia suffers disproportionately: almost 86% of all lives lost are from this region. This is due to poverty and a large population that is concentrated

in dense clusters in tectonically active zones or near low-lying coasts subject to cyclones and tsunamis.

The concept of vulnerability combines measure of risk level of socio-economic ability to cope with resulting event. >90% of disaster-related deaths occur amongst the 2/3 of world population living in developing countries. Disasters hit hardest where the poor are heavily concentrated. In developing countries the rural population outnumbers the urban population. (Note: there are more urban dwellers in the Third World than in Europe and North America). Urban squatter settlements have very high population densities and high vulnerability (many buildings are erected on steep slopes or flood-prone land, or are exposed to elements as they are built without appropriate materials/construction skills /building codes). In highly populated rural areas population densities may still be high and life is a recurrent struggle to cultivate land often degraded by soil erosion. This in turn increases the vulnerability to hazards, e.g. the removal of vegetation and soil systems decreases absorption and storage of water and hence increases risk of both droughts and floods.