

Societal Response to Hazards and Major Hazard Events: Comparing Natural and Technological Hazards

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Danger is an inherent part of human existence. On some occasions we court it for the exhilaration of a particular experience. Sometimes this involves human confrontation of nature, as with mountain climbing or white watering; other times it is human confrontation of technology, as with race-car driving or test piloting. Usually, however, it is interaction not confrontation, and the danger is unwanted. Involved are the threatening processes of nature over which we have limited control or the adverse prices of a technology that otherwise adds to our health, wealth, and well-being.

For most of human experience, the events of nature have exacted the highest toll and caused the greatest concern.¹ Throughout history, floods and drought have been the scourge of mankind, registering such tolls as over one million dead in the 1899-1901 drought in India and in the 1931 Hwang-Ho flood in China. The bubonic plague in Europe from 1348 to 1666 is estimated to have killed some 25 million people, roughly one-third of the population of the continent. Influenza during 1917-1919 claimed 13 million victims in India, over 500,000 in North America, and millions in Africa and Europe.

In developing countries, natural hazards remain as major problems. The losses from geophysical hazards (floods, droughts, earthquakes, and tropical cyclones) alone total an annual average of 250,000 deaths and \$15 billion in damage and costs of prevention and mitigation,² while infectious disease still accounts for 10 to 25 percent of human mortality.³ But in developed societies, major gains have been made on this broad class of hazards. Geophysical hazards, for example, now result in fewer than 1,000 fatalities per annum in the United States, a figure that pales by comparison with the 40,000 to 50,000 annual fatalities from automobile accidents.

Infectious disease, with the notable current exception of acquired immune deficiency syndrome (AIDS), has shrunk to a tiny fraction of its earlier mortality toll. All this has contributed to dramatic increases in life expectancy—from 47 years in 1900 to 74 years in 1979 in the United States.⁴ And technology has often been the handmaiden in reducing ancient hazards and extending the life span.

Yet, technology has emerged as the major source of hazard for modern society. The accumulated exposure of 8 to 11 million workers to asbestos since the beginning of World War II is expected to result in as many as 67,000 workers dying prematurely each year over the next two decades, with cancer rates among the heavily exposed rising to 35 to 44 percent.⁵ The chemical revolution of the 20th century has produced widespread ex-

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