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## Weather and Society Watch

### Focus on Research

#### [A Framework for Weather-Related Fatalities Research](#)

by Ilan Kelman\*

Understanding the root causes of weather-related fatalities is an emerging research area. Previous weather-related deaths studies have tended to focus on demographic statistics (e.g., age, gender, ethnicity, and state of physical and mental health) and medical causes (e.g., drowning, physical trauma, electrocution, and heart attacks). Sometimes, the circumstances surrounding the death are also recorded (e.g., driving, in a building, or on the job). Although these data offer necessary insights, they only touch on why the deaths occurred.

Disaster research recognizes vulnerability as the root cause of disasters. To fully describe vulnerability, we must analyze not only the degree to which people and infrastructure are susceptible to harm from weather at any given time and place, but also the long-term social processes—including politics and economics—which produced the current state of potential harm. Research on weather-related deaths rarely identifies these long-term vulnerability processes, which are dominated by population growth and urbanization, inadequate economic structures, poverty, and lack of leadership and political will at all governance levels.

Development and sustainability research melds these long-term societal challenges with individual vulnerability observations to arrive at the following four levels as a framework for analyzing weather-related deaths:

1. Vulnerability processes
2. An individual's characteristics, incorporating demographic variables along with risk perception and behavioral data, such as warnings received and any warning-related actions taken
3. Hazard characteristics such as wind speed for tornadoes and water depth and debris content for floods
4. Physical mechanisms leading to death, which encompass medical causes

We can see, then, that the "why" of weather-related deaths is, in order of importance:

1. Sociological at the societal level (e.g., poverty, governance, livelihood options), encompassing vulnerability processes
2. Sociological at the individual level (e.g., warning, action, age, gender)
3. Environmental (e.g., high wind speed, deep water)
4. Physiological (e.g., heart attack, head injury).

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Driving through flood waters in Cambridgeshire, U.K. (Ilan Kelman)



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