

## **Lecture Notes: Disaster Vulnerability and Resilience**

### **Session 1**

**Lecturer: JoAnn Carmin**

#### **Introduction**

Through joining the knowledge of students from diverse backgrounds with the participation of guest lecturers, the course will seek the most current knowledge in the field of disaster vulnerability studies.

In the last twenty years, the world has seen exponential growth in the wealth of nations and individuals, which ostensibly has resulted in a steadily increasing quality of life globally. During the same period of time, the world has seen increasing death and destruction as the result of natural disasters. The major question this class asks students to grapple with is: Are we perpetuating entrenched inequalities thus making certain populations more vulnerable to the effects of natural disasters?

Why should we care about natural disasters? For every 10 deaths from disaster, five are due to war and four are due to famine. Though natural disasters may seem less important, they still have a significant impact.

The UN has calculated that every day, a minimum of 184 people will die from a natural disaster, and that approximately 3000 casualties come with every death by natural disaster. In 1960, approximately US \$75 billion was spent to aid recovery from natural disasters. By the 1990s, that number had grown to over US \$660 billion per year for recovery from natural disasters, and these numbers are known to be under-calculated. Transient populations often are not counted while some property is undervalued in these estimates. The real losses associated with natural disasters are therefore much greater than these estimates.

Our charge as scholars / practitioners / policy-makers is to find ways to reverse this trend and to do so while dealing with issues of vulnerability in a truly just way.

#### **Background**

Understanding the genesis of the field of disaster studies is critical to understanding the context of this class.

##### **Circa World War II**

- Planning profession is born with the rise of rational knowledge. In the era of the engineer, planning was guided by the principle that humans could take scientific knowledge and apply it to solving social problems.
- Rational approach leads to a general response to natural disasters as discrete events
- Scientific knowledge applied in response to these events provides a technical fix.

1936

- Gilbert White diverges from that line of thinking by proposing that there may be some human factors involved in natural disasters;
- Milestone in land use planning: assumption that altering human behavior could mitigate the effects of natural hazards;
- The field moves from a focus on technological fixes to the recognition that policy issues and connections between social and natural systems are major factors in natural disasters.

1970s

- Professionals focus on specific fields:
  - Geologists, engineers, and scientists still seeking a technical fix;
  - Geographers, especially in the realm of human geography looking at connections between humans and their environment;
  - Social scientists focus on psychological and collective behavior in response to disasters.
- The field of disaster studies remains fragmented.
- Major natural disasters:
  - Extreme winters in Europe
  - An earthquake in China
  - A cyclone in Bangladesh

1980s

- Disaster studies shift to take into account development, equity, inequity, and poverty.
- The rhetoric of sustainable development begins to develop.
- Major disasters
  - Chernobyl
  - Three-Mile island
  - Bhopal

1990s:

- International Decade for Natural Disaster Reduction
  - Stimulated by belief that socio-political forces from local to global factors into impact disasters have on local to global communities:
    - Poverty
    - Globalization
    - Mega Cities

Present view:

- We need to think about disasters in relation to their socio-political contexts:
  - In order to generate resilient systems and make a difference, professionals need to develop an understanding of the bigger picture.

## Definition of Terms

### Disaster

- When people experience severe damage or disruption to their lives as a consequence of a hazard.
  - Socially defined (“severe”)
  - Element of change
  - Element of loss

### Hazard

- A naturally occurring or human-produced event or occurrence that has the potential to cause damage.

### Natural Hazards

#### Climatological / Atmospheric Hazards:

- Hurricanes
- Blizzards
- Heat waves
- Floods
- Droughts
- Tornadoes
- Dust storms
- Extreme cold
- Wind storm
- Tropical storm
- Avalanche
- Wildfires started from lightning
- Hail

#### Geophysical Hazards:

- Landslides
- Earthquake
- Volcano
- Tsunami

### Technological Hazards

- Toxic chemical releases;
- Transit accident (oil spill);
- Nuclear power plant;
- Building / infrastructure collapse

Because disaster specialists understand the interconnectedness of human action and environmental impact and because the landscape of disaster is shifting to include more technological disasters, a number of grey areas exist that this class will explore over the course of the semester. Natural disasters often are affected by human activities. An example below:

### Flooding:

From one perspective, flooding is a straightforward natural disaster. Rain falls into rivers; they in turn overflow, and cause flooding. Most rivers in the United States and Europe, at least, have been modified from their natural state in some way. The flood could be caused by technological failure of a dam or other infrastructure intended to control water levels. Perhaps climate changes due to human activity have contributed to changes in weather (rain). It is also possible that development patterns resulted in sediment in the waterways forcing the water level in rivers to rise or that generated more impervious surfaces have made it possible for water to move more quickly into waterways, both contributing to flooding.

### What is the continuum from natural to man-made?

- Disasters are not just discrete events from nature, but affected by human activity

### Vulnerability:

- A situation where there is an inability to absorb or remove harm
- Two types:
  - o Physical:
    - Physical environment (buildings/infrastructure)
    - Biophysical environment (associated with geographic locale)
  - o Social:
    - Age
    - Economic status (may have more resources, more protection)
    - Social cohesion
    - Population density (good for social support, bad for potential size of impact)
    - Gender
    - Health/Mental Health status
    - Race
    - Education (ability to access/make sense of information)
    - Immigration/Residential status
    - Culture

### Resilience:

- The capacity to adjust to threats and to mitigate or to avoid harm, e.g.:
  - o Buildings in Japan able to respond to earthquakes
  - o Adaptive systems (e.g. disaster response systems)

### Disaster Cycle:

- A four-step cycle that describes societal response to disaster and threat of disaster
  - o Preparedness: Identifying hazards and problems.
    - Tasks:
      - Policy to reduce vulnerability

- Invest in warning systems/predictive systems
  - Perform a vulnerability analysis
  - Public communication/education
  - Stockpiling (appropriate resources)
  - Evacuation routes, drills, training systems
  - Putting technology in place for rapid response
- Who is involved:
  - FEMA
  - State/Federal Agencies
  - Planners: Zoning, Comprehensive Planning, Local Emergency Planning Commissions,
  - Participatory planning: officials, NGOs, and local representatives from community involved in some planning processes
- Response:
  - Command and control
  - Triage
  - Food and security
  - Repair
  - Secure facilities
  - Abate toxic releases
  - Search and rescue
  - Shelter in place
- Recovery (after Rapid Response):
  - Return to normalcy (perhaps this is not exactly what we want – where does innovation fit in? what constitutes a new normal?)
    - Getting services up and running
- Mitigation:
  - Policies and activities that reduce vulnerability
    1. Structural tools
      - a. Levies
      - b. Dams
      - c. Infrastructure
      - d. Good building practices
    2. Non-structural tools
      - a. Minimize concentration of damage
      - b. Policy tools (including economic tools)
      - c. Insurance
  - Most people think about response-recovery when they think about disasters. Mitigation is perceived as boring, but this stage is very important.
  - The hazard field is moving toward adopting the rhetoric of sustainable development in terms of sustainable mitigation to break patterns of vulnerability and inequity.

For more information see Mileti, Dennis. *Disasters by Design* (1999).

### **Course Objectives**

- Foster global perspective while understanding local context and national sovereignty
- Encourage students to think about where hazards and disasters fit into their fields
- Encourage students to think about the broader landscape to know where their professional activities fit in

This course will focus on the socio-political dimension of disaster studies, and it will balance issues of theory and practice. By end of semester the goal is that students will have many more ideas and analytic tools so that they may be better prepared for professional practice.

### **Course Organization**

The course is organized around guest speakers who will come most weeks and who will often bring interesting/controversial perspectives. The instructors have made an effort to bring in high quality, dynamic individuals with different perspectives on the subject of disaster and vulnerability.

The course is loosely organized around three themes. The first part of the class will generally deal with the topic of vulnerability and the latter part of the semester will focus more on resilience, with the middle of the term dedicated to dealing with issues of policy making. Not all speakers will fit into this organization exactly because of scheduling conflicts.

Students should complete reading responses by Sunday evenings. These responses will serve as a tool to spur class discussions and their completion is mandatory, though individual responses will not be graded. They should not exceed one page in length using a font size no smaller than 11 point. For each of the assigned readings they should summarize the main point and then present a reaction. There should be about one paragraph per reading. Most visiting lecturers have selected the readings for their week's lecture themselves and will be given the option to view the reading responses before coming to class.