

The Human Dimensions of Climate Change

The Political Ecology of Vulnerability

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A. ABSTRACT

This presentation uses a political ecology approach and the example of Hurricane Mitch in Central America to examine biophysical and social vulnerability to extreme weather events and climate change. It begins with a brief summary of the effects of Hurricane Mitch in the region. It then briefly considers various conceptualizations and definitions of vulnerability. It goes on to describe several alternative and contending approaches to vulnerability: biophysical, human ecological, political economic, social/cultural constructivist, political ecological, and others. Political ecology is then presented as a comprehensive framework with the potential to integrate the most relevant components of these various theoretical and methodological perspectives. It then uses a political ecological approach to evaluate recent trends in assessing and reducing biophysical and social vulnerability in the aftermath of Hurricane Mitch. Major conclusions include that although Hurricane Mitch had differential effects on diverse social groups, landscapes, and environments, this heterogeneity has not been directly confronted nor addressed during recovery and reconstruction efforts despite significant participation by many international and national donor agencies and nongovernmental organizations (NGOs). As a result, vulnerability has increased for some groups as well as for already vulnerable ecosystems. Although Hurricane Mitch opened up participatory spaces for civil society, that window of opportunity is closing rapidly. There is mounting evidence of increased social stress and escalating conflicts stemming from the failure to deal effectively with the enduring disaster.

1. OUTLINE OF LECTURE

1. Human Dimensions of Climate Change:

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2. Vulnerability and the Poor

3. The Political Ecology of Vulnerability

- Introduction - Vulnerability and Hurricane Mitch
- What is Vulnerability?
- Theoretical Perspectives on Vulnerability
- The Political Ecology of Vulnerability
- Assessing Vulnerability: The Case of Hurricane Mitch in Honduras
- Conclusions and Recommendations

4. Hurricane Mitch: Full Earth View

5. Hurricane Mitch - 26 October 1998

6. The Track of Hurricane Mitch 22 October - 6 November 1998

7. Hurricane Mitch - 29 October 1998

8. Hurricane Mitch - 30 October 1998

9. The Most Severe Impacts of Hurricane Mitch were in Honduras

10. Widespread Flooding

11. Landslides

12. Mudslides

13. Debris Flows

- Villagers clearing debris in rural area

14. Creation of New Landscapes

- Digging cars out of mud near the Choluteca River

15. Hurricane Mitch Initially Affected 3 Million People (6.2 Million Total Population)

16. Human Costs of Hurricane Mitch in Honduras (>US\$6 Billion)

- Affected an estimated 3 million people out of a total population of 6.2 million.
- An estimated 5,657 dead and 8,058 legally missing
- 1.5 million people displaced and homeless
- 12,272 people injured
- Most of the social infrastructure such as water and sanitation systems, schools, and health facilities were destroyed or badly damaged
- 33% of buildings in the capital city of Tegucigalpa destroyed
- Significant increases in diarrheal diseases and malnutrition

17. More than 25 Villages Were Washed Away

- Village buried in mud and debris

18. 70-80 % of Transportation Infrastructure Destroyed

19. The Majority of Bridges Were Severely Damaged or Destroyed

- Temporary foot bridge built on the pilings of a destroyed bridge

20. Accessibility Index Before and After Hurricane Mitch

21. Damage to Industry and Commerce (US\$600M in direct damage)

22. The Export and Subsistence Agricultural Sectors Sustained the Most Damage (An estimated 70% of total damage or US\$ 1.7 B)

- 58% corn lost
- 24% sorghum
- 14% rice
- 6% beans
- 85% bananas
- 60% sugar cane
- 28% African Palm
- 18% coffee

23. Virtually All Parts of the Country were Affected - Including Urban Centers

24. The North Coast Suffered Major Flooding of Banana Plantations, Roads, and Urban Centers

25. The Interior Highlands

26. Coastal Zones in the North and South

- The Gulf of Fonseca in Southern Honduras
- Area where force of storm-driven river flow destroyed coastal mangroves

27. The Bay Islands

- Aerial view of a dead mangrove forest 14 months after the storm. Virtually all mangroves on the island of Guanaja were killed by Mitch.

28. Definitions of Vulnerability

- Several similar definitions of "vulnerability" can be found in the current literature (e.g., Blaikie et al. 1994; Cannon 1994; Hewitt 1997; Adger 1999; Oliver-Smith and Hoffman 1999; Clark et al. 2000; Kelly and Adger 2000).
- For example, Clark et al. (2000) define vulnerability "as the risk of adverse outcomes to receptors or exposure units (human groups, ecosystems, and communities) in the face of relevant changes in climate, other environmental variables, and social conditions."

29. Vulnerability as a Multidimensional Concept

- **EXPOSURE** The degree to which a human group or ecosystem comes into contact with particular stresses.
- **SENSITIVITY** The degree to which an exposed unit is affected by exposure to any set of stresses.
- **RESILIENCE** The ability of the exposure unit to resist or recover from the damage associated with the convergence of multiple stresses. (Clark et al. 2000)

30. Theoretical and Methodological Approaches to Understanding Vulnerability (McLaughlin and Dietz n.d.)

- The Biophysical Approach (Browder 1989)
- The Human Ecological Approach (Moran 1990)
- The Political Economic Approach (Kelly and Adger 2000)
- Postmodern, Constructionist Approach (Tierney 1999)
- The Political Ecological Approach (Stonich 1993, 2000)
- Other New Directions - e.g., evolutionary approaches

31. The Biophysical Approach to Vulnerability

- "Focuses only on the vulnerability or degradation of biophysical conditions and extrapolates directly from these

estimates to the impact on the human occupants of a landscape" (Liverman 1990: 29).

- The dominant approach employed in studies of vulnerability to natural hazards and climate change (Hewitt 1995; Clark et al 2000).
- Assessment of biophysical factors is a necessary but not sufficient condition for understanding the complex dynamics of vulnerability (McLaughlin and Dietz n.d.).
- Neglects structural factors and human agency both in producing vulnerability and coping/adapting to it (Lambert 1994).
- Overemphasizes extreme events while neglecting root causes and everyday social processes that influence differential vulnerability (Hewitt 1995).
- Can result on over reliance on experts, science, and technological solutions (Liverman 1990; Pulwarty and Riebsame 1997).

32. The Human Ecological Approach to Vulnerability

- Essentially embeds human systems within ecological processes (e.g., Moran 199).
- Early work was criticized for its overemphasis on functionalist and/or developmentalist frameworks that underestimate heterogeneity and conflict within human groups and in human-environmental relations.
- Essentially apolitical in its outlook - does place human-environmental interactions within broader political and/or social context.
- Examples include more recent work on adaptation and on household livelihood/subsistence/survival/coping strategies.

33. The Political Economic Approach to Vulnerability

- Essentially conceptualizes vulnerability as a class phenomenon.
- Political economic perspectives on vulnerability have emerged in several disciplines
- theory of marginalization (Susman et al 1983)
- food entitlements (Sen 1981)
- drought and famine (Watts and Bohle 1993)
- Emphasizes central role that differential economic and political power (structural factors) play in determining differential vulnerability of individuals and groups (Greenberg and Park 1994).
- Criticized for neglecting historical diversity of response, under emphasizing the role of human agency, and diminishing the role of the environment as an independent factor/variable that affects social relations (Bryant 1992).

34. Social/cultural Constructivist Approaches to Vulnerability

- In contrast to political economists who emphasize structural factors, constructivist theorists focus on the role of human agency and culture in explaining differential vulnerability.
- Emphasize that policy makers and scientists who study vulnerability "do not possess a privileged vantage point but rather are an integral part of the patterns of social processes that can either contribute to or mitigate vulnerability" (McLaughlin and Dietz n.d.).
- Demonstrate that so-called disaster "victims" also actively cope and respond to events and situations (Fordham 1999).
- Criticized on the grounds that they neglect social structure and consider the biophysical environment as an independent factor/force affecting human society (Rosa and Dietz 1998).

35. Political Ecology (PE)

- PE had its origins in multidisciplinary efforts to integrate human/cultural ecology with political economy (Blaikie and Brookfield 1987).
- PE analysis includes several components including ideology, international interests, class structure, market relations, environment/ecology, and human agency.
- PE analysis follows a chain of explanation through different scales (levels of analysis) from the individual through the local, national, regional, and international (global).
- Concerned with analyzing complex human-environmental interactions, especially those related to economic development and environmental destruction in developing countries.

36. Advantages of Political Ecological Analysis (Stonich 1993, 2000)

- It is interdisciplinary - integrating human and biophysical factors.
- It centers on understanding cross-scale linkages - from the local through the global.
- It attempts to link social structure, human agency, and the biophysical environment.
- It has the potential to integrate environment-first, society-first, and policy oriented studies.
- It can demonstrate and lay-out the differential vulnerability of human groups by class, ethnicity, gender, age, spatial location, and/or other relevant categories.

37. An Example of a Research Methodology that Uses a Political Ecological Approach to Understand Vulnerability in Southern Honduras (Stonich 1993)

38. Assessing Vulnerability: The Case of Hurricane Mitch in Honduras

- The nature of vulnerability in Honduras
- Biophysical vulnerability
- Social vulnerability
- The patterns of damage and destruction in Honduras and their links to patterns of vulnerability.
- A preliminary assessment of how and to what extent efforts at recovery and reconstruction have reduced (or are likely to reduce) vulnerability.

39. Biophysical Vulnerability: The Tracks of 1998 Atlantic Hurricanes

40. Atlantic Hurricanes in Honduras (1950 - 1998)

41. Climate Risk Index

42. Coastal Risk Index

43. Links between Social and Biophysical Vulnerability (1)

44. Links between Social and Biophysical Vulnerability (2)

45. Limitations of Risk Indices: e.g., Forest Risk Index

46. Southern Highlands: Dry and Rainy Seasons (A Region at Risk)

47. GOH Master Plan for National Reconstruction and Transformation: Major Objectives

- Rehabilitate and vitalize the productive sector.
- Rebuild and improve the country's infrastructure.
- Rehabilitate and reform the social sector.
- Strengthen the macro-economic stability.
- Institute a new plan to prevent and mitigate disasters.
- An efficient and transparent management of the resources destined for reconstruction.

48. Reconstruction and Vulnerability in the Aftermath of Hurricane Mitch in Honduras

- Participation by the same multilateral and bilateral donors (e.g., UNEP, World Bank, IMF, EU, USAID, USGS, USDA, and other bilateral donors from Japan, Europe).
- Participation by an unknown number of NGOs.
- Emphasis on biophysical approaches and technological fixes.
- Center on jump-starting rapid economic growth.
- Deploying old and often failed development strategies (e.g., agriculture, aquaculture, tourism, and free-trade zones).
- Some evidence of opening up of a political space for civil society - big question about whether or not this window of opportunity will result in fundamental changes.

49. Example of Biophysical Approach and Technological Solutions
50. United States Geological Survey (USGS) Project Sites in Central America
51. Dredging Operations, Tegucigalpa 29 April 1999
52. Post-Mitch Images from Honduras (2000)
53. Post-Mitch Images from Honduras (2000)
54. Post-Mitch Images from Honduras (2000)
55. Post-Mitch Images from Honduras (2000)
56. Conclusions

- Hurricane Mitch has had differential effects on diverse social groups with varying amounts of power and different degrees of vulnerability.
- To some extent everyone was "vulnerable" to some degree but certain individuals, groups, communities, and economic sectors were better able to protect themselves and to recover more quickly.
- There is little evidence that this heterogeneity has been directly confronted and addressed during recovery and reconstruction - implying the necessity for thorough sociocultural analysis.
- As a result, vulnerability has increased for some groups (especially the poor, children, and more isolated communities).
- The primary international and national objective appears to be rapid economic growth rather than sustainable development.
- Oxfam analysis: Many Hondurans were worse off one year after Mitch than before Mitch or even compared to the 1970s.
- According to a UN report, the major problems that Hondurans now face are the same as in the past - only now they are harder to solve.
- Mitch opened up participatory spaces for civil society but that window of opportunity is closing rapidly.
- Social discontent appears to be rising and it is likely that failure to deal effectively with the enduring disaster is aggravating tensions in an already conflict ridden region.

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