

Climate Vulnerability Hotspots

Identifying regions at high risk regions or “hot spots” can provide important information to the design effective adaptation strategies. Populations living in poverty maybe more vulnerable to climate change but they often have established coping strategies. These coping strategies and overall levels of vulnerability are shaped by multiple factors that affect actors differently, even within one region. Future research should involve integrated, multiple factor approaches for analysis of hotspots and encourage international dialogue towards developing the methods and management approaches.

Where and who is vulnerable?

The rationale for conducting analyses of hotspots or high-risk regions is that the overwhelming proportion of potential ecological damage and human loss is highly concentrated in vulnerable ecosystems and peoples. Therefore, identifying the regions and peoples at greatest risk due to natural variation and human-induced changes and assessing the sources and causes of the vulnerability can be a highly effective means for designing and targeting adaptation. The term “hotspot” is widely used to define critical and priority areas in various applications including biodiversity, food security and water scarcity. In the context of climate change, the term hotspot is often used to indicate an area where many of the natural systems and the human populations are highly vulnerable to present and future risk of climate change and have urgent but diverse priorities for adaptation.

We would expect that areas with populations in poverty would be vulnerable to climate change. At the same time, however, resource-dependent societies and communities often have well-established strategies for coping with perturbations and change. Thus identifying vulnerability hotspots in terms of areas or regions runs the risk of losing fine resolution detail on social processes that make individuals vulnerable. Vulnerability has multiple causes and multiple social manifestations. When these factors are taken into account, we would expect that marginal agricultural areas with low and variable productivity, low-lying areas in floodplains and on coasts subject to inundation and salinisation, as well as economically isolated localities would comprise many of the vulnerability hotspots.

Present research on identifying hotspots

An integrated hotspot analysis identifies geographically delineated areas where there are compounding threats, vulnerability and impacts. Three elements are important for integrated hotspots analysis: knowledge of outcomes or impacts of climate change; knowledge of threats or stress complexes; and understanding of the spatial distribution of vulnerability or maps. There are, at

present, many studies that consider single dimensions of these parameters. The fewer, more comprehensive integrated studies of hotspots utilise indicators and explore all dimensions of threat, impact and vulnerability. Key findings from work on hotspots and on indicators include:

- The effects of climate-induced vulnerability are very unevenly distributed across regions, across time, and particularly across socio-economic factors. Dependent individuals and marginalized social groups are invariably more vulnerable both to climate change and to other pressures.
- Future vulnerability does not necessarily map directly on to present day vulnerability. Some groups, localities and regions will be particularly affected by changing climate variability or gradual changes in climate.
- Identifying emerging vulnerability hotspots is contingent on projections both of impacts and of socio-economic futures. Hence vulnerability hotspots cannot be identified in isolation from specified scenarios, adaptation options, and institutional change.
- It is possible to compare the vulnerability of people and places across time and space at different scales. It is less meaningful to aggregate or compare vulnerability across scales since the processes that cause vulnerability are different at each scale. It is possible to develop generic indicators of vulnerability and of adaptive capacity at the national level for policy purposes. But these indicators are limited in terms of their explanatory power, particularly in the adaptation strategies that can be developed.

Agenda for future research

There are a number of issues to be addressed if vulnerability hotspots are to be useful as analytical or prescriptive tools:

- Who is vulnerable in vulnerable places? Identifying areas as vulnerable smoothes over the inevitable differentiation of winners and losers from processes of social and environmental change within a place. There are many processes that contribute to vulnerability

that need to be adequately integrated into vulnerability mapping or ranking.

- Are groups or individuals made vulnerable by adaptation strategies? Any action to reduce the vulnerability of an area, or even of a particular group, will itself have uneven impacts. Adaptation strategies themselves need to be appraised for their fairness, both in processes of decision-making, and in terms of their outcomes for all stakeholders.

At the same time, the use of hotspots analysis raises important questions:

- Where are the vulnerable areas? And what happens when these areas are identified? Vulnerable hotspots can suffer from development or planning 'blight' simply by being identified as being vulnerable to climate change. The role of expectations is important in developing a risk management process that acknowledges the impacts of designating areas as vulnerable or less vulnerable.
- Nevertheless, hotspots are critical for spatial planning in urban areas, planning for water resources and other adaptation strategies. How can they be institutionalised?
- Typically only one or a couple sources of stresses and threats have been included in hotspots analysis. How do we deal with cumulative stress (both multiple and temporal) and stress synergies?
- Expert judgment qualified observer input and local knowledge will be critical components of any future work. Should we develop a systematic way of dealing with subjective & political considerations and organizing such processes.
- What is the state of the art in the use of participatory techniques in conjunction with GIS? How can individual or group perceptions and knowledge of issues be incorporated into a spatial framework?

An initial step forward would be to establish an international dialogue on 'hotspot' techniques, comparing case studies with the aim of preparing a guide to best practice.

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