

Understanding Human Vulnerability to Coastal Hazards and Adapting to Uncertain Futures

Frank Thomalla and Fiona Miller

Stockholm Environment Institute (SEI)

www.sei.se

frank.thomalla@sei.se

fiona.miller@sei.se



LOICZ II Inaugural Open Science Meeting, Egmond aan Zee, Netherlands, 27-29 June 2005

Global environmental change

Humans have made unprecedented changes to ecosystems in recent decades to meet growing demands for food, fresh water, fiber and energy.

Human-induced global change is expected to increase the frequency, duration and magnitude of periods of abrupt change:

- Melting of glaciers
- changes in freshwater availability
- altered rainfall patterns
- redirections of major currents
- increased erosion
- reoccurrence of floods and storms
- emergence of new diseases
- environmental degradation of coastal habitats
- loss of biodiversity

The scale of present human activities is so extensive that the capacity of the planet's ecosystems to sustain present and future generations can no longer be taken for granted.

(Millenium Ecosystem Assessment Synthesis Report, 2005)

Social and economic changes

- During the last few decades many coastal areas have also been particularly affected by rapid social and economic changes including:
 - population growth and rapid urbanisation:
 - increasing concentration of populations in coastal zones
 - globally over one billion people (23% of world population) live within 100m elevation and 100km distance of the coast
 - populations are highly concentrated in large cities and coastal towns
 - large-scale commercial infrastructure, industrial aquaculture, and tourism development.
- Many drivers of change manifested at the coast are part of broader structures and processes.
- Individuals and communities are experiencing new kinds of vulnerabilities as a result of complex interactions with global environmental and socio-economic processes, such as climate change and economic globalisation.

SEI's research activities relating to coastal issues

- **Natural disaster impacts and challenges for mainstreaming**
- **Social learning, institutions, and vulnerability to natural hazards in Honduras**
- **Institutions and gender-differentiated vulnerability to floods in Central Vietnam**
- **Sustainable recovery and resilience building in the Tsunami affected region**

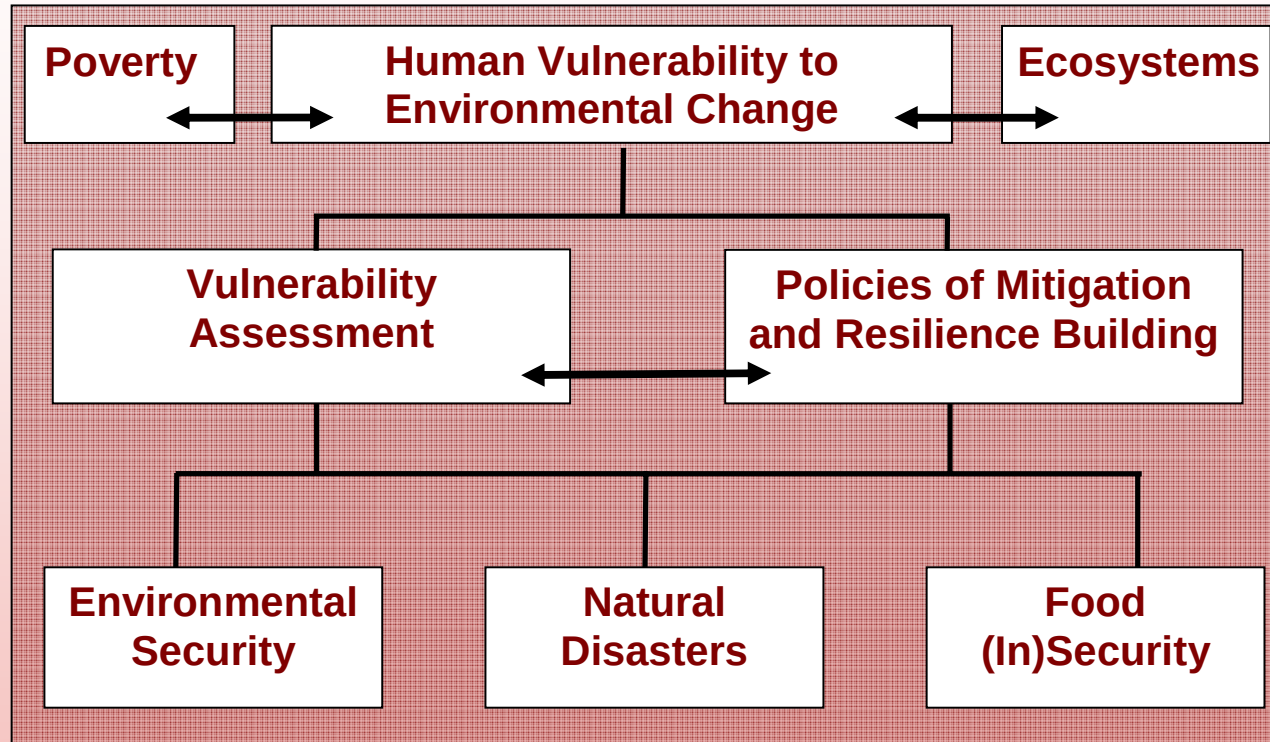
A Global Programme on Poverty and Vulnerability

Contribute to an improved understanding of the vulnerability of poor and marginalised people to environmental change:

- **Develop tools and analytic approaches for vulnerability assessment.**
- **Develop specific recommendations for key policy processes aimed at reducing vulnerability and building resilience.**
- **Develop strategies for the integration of vulnerability reduction efforts into wider sustainability initiatives such as the MDGs and Sida's Country Strategy Papers.**
- **Build capacity in local government and community-based organisations.**
- **Increase awareness of and access to information on vulnerability analyses and approaches.**



Focus and approach



Who is most vulnerable to coastal hazards?

- **Particular social groups:** women, the elderly, children and orphans, ethnic and religious minorities, single-headed households;
- **Particular livelihoods:** fishers and others involved in fisheries (traders, processors), people involved in informal economies, and those engaged in economically marginal livelihoods;
- **Socially excluded groups:** 'illegal' settlers and others who's rights and claims to resources are not officially recognised;
- **Economically or politically marginalised groups:** those with inadequate access to economic (credit, welfare) and social capital (networks, information, relationships);
- **Recent migrants to coastal areas and others not well connected to social networks**

Case study: Institutions and gender-differentiated vulnerability to floods in Central Vietnam

- Thua Thien Hue Province, Central Vietnam – a province severely affected by floods, typhoons, coastal storms and surges.
- The study aims to:
 - Analyse key aspects of gender-differentiated vulnerability to floods at the household level
 - Identify how institutions influence the vulnerability of households to floods
 - Investigate the influence of the socio-economic status of households on patterns of vulnerability
 - Engage with the wider research community and policy makers on the gender-dimensions of vulnerability to floods
- 3 case study areas: upland, mid-land and lowland along the Song Bo river – major tributary of the Huong River

Bridge damaged
in 1999 flood



Source: F. Miller

Case study: Institutions and gender-differentiated vulnerability to floods in Central Vietnam

- There are gender differences in the division of labour, and access to resources and power
- Women and men differ in the ways they manage and benefit from environmental resources, and are affected differently by the degradation of natural resources.
- Women generally experience larger negative impacts than men due to their relative lack of resources and different roles in decision-making.
- Understanding how gender shapes differences can help identify appropriate interventions to minimise impacts.
- Institutions are important in shaping the roles and responsibilities of men and women.
- Institutional structures also help define access to resources and decision making processes.

Landless boat-people



Source: F. Miller

Case study: Directions for post-tsunami resilience building

Livelihoods in the coastal zone, Sri Lanka - before the Tsunami

- Diverse livelihoods dependent on coastal zone resources
 - freshwater rice based systems, lagoon and estuary fisheries, marine fisheries, aquaculture, other natural resource based livelihoods, tourism, and non-natural resources based livelihoods.
- Degradation of key coastal ecosystems
 - mangroves, coral reefs, sea grass beds, estuaries, sand dunes
- Increasing pressure on and competition over coastal resources
 - tensions and conflicts (spatial, sectoral, upstream-downstream)
 - rising water scarcity
- Changing approach to coastal zone management:
 - top-down penalty, regulatory system to a more integrated, participatory approach,
 - focus shift from resource to livelihoods.

Boat stranded by tsunami



Source: F. Miller

Livelihoods in the coastal zone, Sri Lanka – after the Tsunami

- Environmental damage of tsunami particularly severe due to high number natural resource-based livelihoods
- Evidence that resilient coastal ecosystems buffered tsunami impacts, in some areas
- Water
 - salinisation of aquifers, wells, wetlands, agricultural land (impermanent)
 - pollution of dug wells and shallow aquifers
 - pipe-borne water supply and sewerage systems heavily damaged
 - rapid humanitarian response averted serious spread of disease
 - disruption of freshwater systems implications for agriculture and lagoon fisheries livelihoods
- Key livelihood groups affected include those who:
 - depend directly or indirectly on fishing
 - depend on small scale production and service provision
 - depend on wage and salaried labour in the tourist sector
 - do not live on the coast but who lost income generating members (ICRC, 2005: 49)

Abandoned house



Source: F. Miller

Recovery of livelihoods: How to build resilience?

- **Considerable damage to both fisheries and freshwater systems in the coastal zone that underpin fisheries-related and land-based livelihoods**
 - **need to look at restoration of fisheries and land based livelihoods in an integrated way**
 - **consider upstream-downstream interactions and impacts of agriculture and aquaculture on lagoon fisheries and water quality**
- **A shift of thinking from regulations, prohibitions, fines, and enforcements to more participatory approaches to CZM will assist recovery.**
- **By supporting sustainable livelihoods and creating alternative livelihoods for those involved in unsustainable resource use more resilient ecological and social systems can be realized.**
- **Need to be sensitive to context and be informed by pre-existing tensions and challenges to sustainable livelihoods.**
- **Practical solutions need to support diversity, yet at the same time take an integrated approach and ensure community participation**



Source: Mayer/IFRC

International engagement and key publications

The **Poverty and Vulnerability Programme** regularly hosts and contributes to international workshops involving research and policy institutions, governments, civil society organisations and other stakeholders. The depth and breadth of issues addressed in our reports reflect our engagement in a wide range of issues related to poverty and vulnerability reduction worldwide:

Workshops

- ◊ Workshop on Biosafety Capacity Building in Eastern and Southern Africa. SEI, Stockholm, October 2002.
- ◊ Workshop on Food Security. SEI, Stockholm, June 2003.
- ◊ International Workshop on Adaptation Research, New Delhi, India, November 2003.

Titles of Key Reports

- ◊ Agricultural Biotechnology in Developing Countries (2004)
- ◊ Biosafety Capacity Building in Eastern and Southern Africa (2003)
- ◊ Connecting Health with Vulnerability to Environmental Stress (2005)
- ◊ Food System Scenarios: Exploring Global/Local Linkages (2005)
- ◊ Generic Aspects of Institutional Capacity Development in Developing Countries (2004)
- ◊ Integrating Perspectives on Environmental Security (2003)
- ◊ Linking Water Scarcity to Population Movements (2005)
- ◊ Vulnerability Profiles of Burkina Faso, Mali and West Africa (2005)
- ◊ When Rapid Changes in Environmental and Economic Conditions Converge: Challenges to Sustainable Livelihoods in Dak Lak, Vietnam (2005)

All reports can be downloaded from our website at www.sei.se/risk/poverty.html



Photo: Eva Lindberg

For further information about the **Poverty and Vulnerability Programme** please contact:

Dr. Frank Thomalla, Programme Manager
Poverty and Vulnerability Programme

Stockholm Environment Institute (SEI)
Lilla Nygatan 1, Box 2142, S-103 14 Stockholm,
Sweden

Tel: +46 8 412 1400
Fax: +46 8 723 0348
frank.thomalla@sei.se

These Sida-funded activities are situated within the SEI cross-centre programme on **Risk, Livelihoods and Vulnerability** which focuses on applied research and policy support to address the challenge of reducing human vulnerability to environmental and socio-economic change and to support the overall goals of poverty reduction and sustainable development.

For information about this programme please contact Dr. Tom Downing (tom.downing@sei.se) or visit the SEI website or www.VulnerabilityNet.org.



www.sei.se

Cover photo: Björn Larsson/Ask

Poverty and Vulnerability



Thank you!

Dr. Frank Thomalla

Risk, Livelihoods & Vulnerability Programme

Stockholm Environment Institute (SEI)

www.sei.se

frank.thomalla@sei.se