

Resilience, Rights and Resources: Two years of recovery In coastal zone Aceh



The tsunami as test of resilience of coastal livelihoods in Aceh: Overview of an integrated natural resource management approach to rehabilitation

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Introduction

The earthquake and subsequent tsunami of 26 December 2004 killed nearly quarter million people in the coastal zones around the Indian Ocean and displaced 2 million more who lost their houses and other assets as well as livelihood options. An unprecedented pledge of assistance matched the disaster, with Indonesia and Sri Lanka as main targets.

Table 1. Key data on damage caused by the tsunami of 26th December 2004

| | Number of people dead or missing | Damages and losses (% of GDP) | Damages and losses (US\$ millions) | International funding (% of total) | International funding (US\$ million) |
|--------------|----------------------------------|-------------------------------|------------------------------------|------------------------------------|--------------------------------------|
| Indonesia | 167,540 | 2.0% | 4,451 | 37.2% | 5,233 |
| Sri Lanka | 35,322 | 7.6% | 1,454 | 23.5% | 3,306 |
| India | 16,269 | 0.2% | 1,224 | 13.2% | 1,857 |
| Thailand | 8,212 | 1.4% | 2,198 | 0.7% | 98 |
| Maldives | 108 | 83.6% | 603 | 2.5% | 352 |
| TOTAL | 227,451 | | 9,930 | 77.1% | 10,846 |

Source: Mangroves for the Future: A strategy for promoting investment in coastal ecosystem conservation 2007-2012.
<http://www.iucn.org/mff/>

Early on the international aid agencies decided to use a common 'livelihood' framework for the data gathering needed to plan and implement their activities and programs. Because there was very little direct experience on what livelihoods entailed before the Tsunami, and the available statistics were incomplete and partially unreliable due to the security problems, the initial focus was on fishermen, mangroves and rice-fields that were devastated by the tsunami. Understanding of the diversity of coastal vegetation and economic activities only gradually emerged later (Figure 1A and B). For example, the productive role of trees in the local economy was not apparent in the initial appraisals and plans for livelihood support.

The livelihoods strategy approach

On a more conceptual level, the Tsunami disaster provides a challenge to the existing Integrated Natural Resource Management and Livelihood paradigms. The asset or capital approach in livelihood research can demonstrate its relevance beyond the 'income' considerations of simplified poverty indicators; the capital types that provide 'safety-nets' (both natural and social capital) were tested to their limits. At the same time, the need for an integrated approach to coastal zone development and the likely imbalance between private benefits of shrimp pond development and the social cost of loss of wave-filter functions of the mangrove replaced is imperative.

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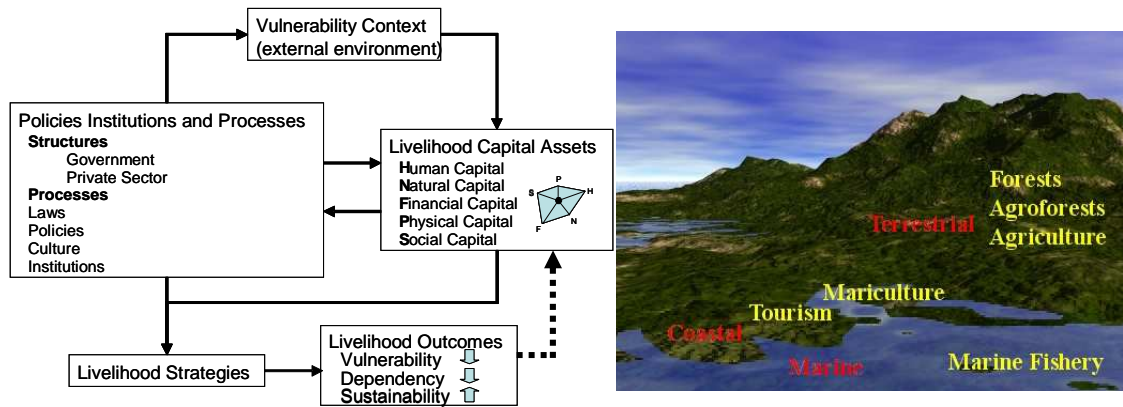


Fig. 1A (left) The Sustainable Livelihoods Framework as developed by DFID (see www.livelihoods.org) and B (right) the challenges for integrated natural resource management across sectors and landscape components.

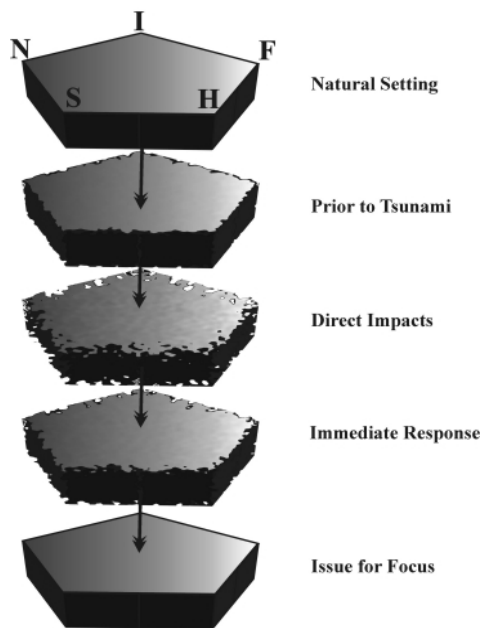


Figure 2. The pre-tsunami situation in Aceh was already strained, both politically and in natural resource issues. Rebuilding lives on the coastal zone will require sensitivity to the historical and cultural context.

Results of the December 2005 workshop in Meulaboh

Application of the livelihood framework to analysis of resilience lead to recognition (Figure 2) of the five 'asset' categories. In subsequent analysis, it has become clear that the 'resilience' or ability to bounce back of the various components of the overall system is not directly linked to the severity of the impact.

Destruction and recovery of the five capitals

Most components of the '**natural capital**' have in fact bounced back faster than anticipated. This may be linked to the fact that on a timescale that is relevant for the formation of the landscape and the evolution of the biota, the 2004 Tsunami was not unique. On most of the flooded soils, salt sea water did not penetrate deep during the flooding, as the soil was already close to saturation. The salt (sodium chloride) that did get into the soil was washed away by the heavy rains within a few months. In fact, many of the soils increased their fertility with the marine silt deposits, although elsewhere soils were decapitated or submerged due to land subsidence after the earthquake. A number of peat 'lenses' in the coastal plain proved to be tolerant of the flood, and provided shelter to the people using this zone for rubber agroforests. The immediate impacts on the trees in the coastal zone varied with tree type, tree size (exposure of the canopy to the waves determined the force exerted, the strength of the root systems the forces withstood), surrounding vegetation and location. Tree mortality after the flooding did not follow patterns expected on the basis of salinity tolerance; for example, according to existing databases rambutan fruit (*Nephelium lappaceum*) is supposed to be more tolerant than rubber (*Hevea brasiliensis*), but in fact it suffered a high mortality, while the rubber trees that were not knocked over by the waves, lost their leaves, 'wintered' and recovered in a few months time. A number of palm species with economic value proved to be tolerant and resilient. The west coast of Aceh did not have much mangroves before the Tsunami, as the coast is too exposed. Only in the mouth of a number of rivers were mangroves present, and they withstood most of the wave impact. The role of these mangroves for the coastal fish populations is currently under study.

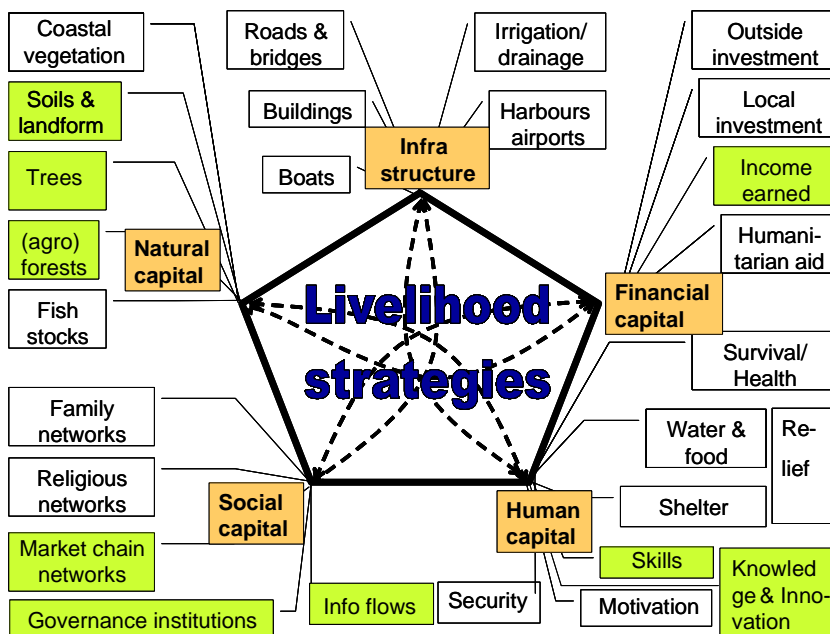


Figure 3. Examples of the five capitals affected by the Tsunami. ICRAF and partners are addressing some of key aspects of recovery and development (green nodes).

The Tsunami impacts on **physical infrastructure** were dramatic, and the greatly reduced accessibility of the area substantially increased the human impact of the Tsunami, while making the rescue and relief phase of the response more difficult. Sections of coastal roads disappeared; bridges were washed out, airstrips covered by mud and harbors destroyed. Recovery of infrastructure is not based on 'inherent resilience', as is the case for natural capital, but is fully dependent on human effort. Destruction of infrastructure meant prominent economic activities such as trading and marketing, that were part of local livelihood strategies, were severely affected. While the soil and trees of the rubber agroforests were resilient and many of the tappers/farmers survived, the road access to the processing factories was not, and recovery is a slow process.

The impacts on **human capital**, for obvious reasons, received the most immediate attention. Beyond rescue and relief, however, the recovery of livelihood options requires a combination of skills, motivation and access to up-to-date information and knowledge. Resilience of livelihoods does not necessarily imply a return to the conditions before the disturbance – shifts to equivalent or better opportunities should be a part of the response. However, the psychological level of stress hampers the ability to envisage plausible futures and innovate accordingly.

Social capital in the coastal zone of Aceh has been an important base of resilience, especially the family and religious networks that absorbed survivors. The (re)emergence of traditional resource management institutions such as the 'Panglima Laut' ('sea cap-tains') has been relevant especially for channeling the perspectives of the fishermen; the equivalent organizations for land-based activities have been less visible. The recovery of Aceh took a dramatically positive turn with the peace accord that ended decades of conflict. The peace that ensued opens up new economic opportunities – as well as environmental threats to the remaining forests of the inland areas that had so far been 'protected by civil war'

An important dimension of social capital in the form of formal local governance systems has been less resilient than hoped for. The direct loss of lives in many of the agencies has caused a delayed ability to return to the capacity at pre-Tsunami level, which was already below the average in Sumatra, partly in response to the internal conflicts. The outside agencies that stepped into the vacuum were effective at the rescue & relief level, but faced more challenges where long term recovery is involved.

Substantial 'confusion' over the desirability and feasibility of a wide zone of protective coastal vegetation - although the realization that mangroves only occupy a specific landscape niche emerged relatively fast. However, the lack of clarity of whether 30, 50, 500 or 2000 m of the coastline should/would be kept free from houses has been an obstacle to progress. The absence of decision making at the relevant scales as well as the lack of reliable information to base decisions upon has been (and continues to be) an obstacle. The fact that the coastline itself, the basis for any zonation, has changed raises questions on prior rights and public responsibilities.

Finally, the immediate **financial** loss was no worry to the international insurance companies (in contrast to the hurricane Katrina damage in the USA) or financial markets (again in contrast with Katrina's effect on oil prices), because the affected areas were still relatively poorly connected to the global economy. The largely emotional response of the rest of the world providing humanitarian aid as well as investments in economic recovery, lead to a situation where financial capital was not a constraint – but the related processes of governance and the challenges of converting financial capital into enhancement of the other capital types was.

Overall resilience of a system is potentially limited by the resilience of the most vulnerable subsystem and the opportunities for changes in system configuration. The governance aspect of the social capital as well as the market access for major tree crops have been the weakest parts in the overall resilience of the system.



Figure 4. Some mangrove vegetation exist at the mouth of rivers in West Aceh



Figure 6. Kebun karet (rubber gardens) in West Aceh are important for household income and contribute significantly to the resilience of the system tsunami-like disasters



Figure 5. Reconstruction of washed away roads and bridges along the western coast of Aceh are vital physical capitals for post-tsunami recovery and future prosperity.

KEY MESSAGE

- Early focus of post-tsunami recovery on fishermen, mangroves and rice cultivation was partly due to lack of understanding/ appreciation of local livelihood strategies and the five capitals – natural, infrastructure, human, social and financial.
- Integrated approach to coastal zone development should include a through analysis of the pros and cons and the 'safety-net' properties of the various capital components.
- In two years after the tsunami:
 - most components of the natural capital have largely recovered along the western coast of Aceh;
 - the reconstruction of physical infrastructure (roads, bridges, market places) is very slow.
 - people's hopes for recovery and future prosperity are encouraging.
 - following the peace agreement, social capital is going through an important transition
 - the unprecedented amount of aid and support means financial capital is not a constraint (although 'over supply' may become a problem)

World Agroforestry Centre (ICRAF) is one of 15 organizations under the CGIAR (Consultative Group on International Agricultural Research) umbrella. ICRAF aims to stimulate and conduct innovative research, development and capacity building to promote and support agroforestry for both human and environmental benefits. ICRAF has its headquarters in Kenya and six regional offices in the tropics and now cover 21 countries in Africa, Asia and Latin America.

The research bulletins are summary results of collaborative activities of ICRAF and partners in the "Recovery and Resilience of Livelihood and Natural Resources", mainly in West Aceh, after the Tsunami of 26th December 2004. These bulletins were prepared, first in Indonesian language, for a workshop in Meulaboh on 30 November 2006. The primary objective was to share relevant result findings and observations among government and non-government organisations and individuals involved in the post-tsunami recovery in West Aceh. The workshop and preceding research activities were supported by Ford Foundation Indonesia, EU Asia Pro-Eco Program and CGIAR.

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